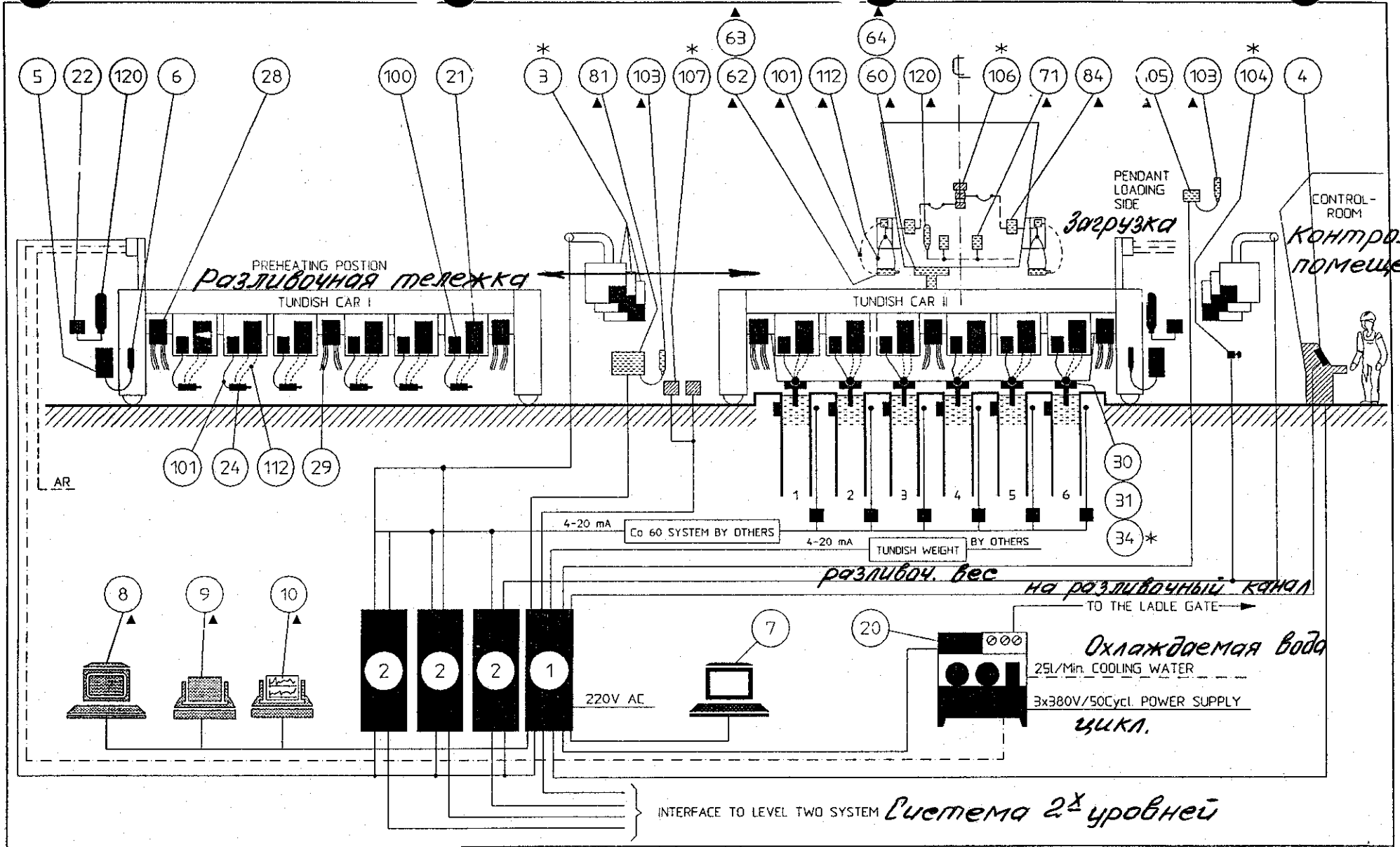
1	**General** **Layout, Equipment List, Mounting Proposal, Consumption, Motor List**	Общий
2	**Mechanics 13 QC** **Assembly Drawings, Repair and Control Drawings**	Механика
3	**Hydraulic Equipment** **Functional Description, Assembly Drawings**	Гидравлическое оборудование
4	**Gas Equipment** **Functional Description, Assembly Drawings**	Газовое оборудование
5	**Hydraulic Cylinders** **Description of Stroke Measuring System, Assembly Drawings**	Цилиндр гидравлический
6	**Preparation Area** **Test Hydraulic Unit, Devices, Tools**	План расположения разливочной установки 13QC. Гидростанция ТО1-1 Техническое описание.
7	**Refractories** **Refractory Arrangement, Submerged Nozzle, Consumption**	Огнеупорные изделия для бесстопорной разливки стали через разливочное устройство.
8	**Operation** **Operation prior to Start-up/Preheating, Operation while Casting, Operation/Handling of 13 QC**	1. Технологические инструкции подготовки к работе разливочного устройства 2. Инструкция по монтажу узла бесстопорной разливки стали для разливочного устройства типа 13QC.
9		
10		
11		
12		

Эп2-770-35-3



* DELIVERY BY OTHERS
▲ OPTION

			DATE	01.03.95
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			SCALE	
c	11.04.95	Ba/so		
REV	DATE	NAME	ORIGIN :	

UNIT NO.:
PROJECT NO.: 2014/419
CUSTOMER: CIS PROJECT VIA ROKOP USA

INTERSTOP®
Stopinc Aktiengesellschaft CH-6341 BAAR

Общая схема управления разливочным устройством
GENERAL LAYOUT SHOWING THE TUNDISH AND LADLE GATE CONTROLS

MICRO	FORMAT	NO.	SHEET	INDEX
	D	116759	OF	a

REPL. FOR : REPL. BY :

Эл2-170-35-40 стр3

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INTERSTOP

Customer : Red October via Rokop
Project No.: 2014/419

1. General Общий

1.1 General Layout Общая схема

1.2 Equipment List Список оборудования

1.3 Assembly Proposal for INTERSTOP Equipment Сборочные предложения для оборудования Interstop.

1.4 Mounting Proposal 13 QC Установочные предложения 13QC.

1.5 Consumables, Consumption, Motor List Расходная возможность, Расход, Список двигателей.

Эп2-770-35-4

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INTERSTOP

Customer: **Red October, via Rokop USA**

Project No.: **2014 / 419**

EQUIPMENT LIST

Описание Перечень оборудования

Item Pos.	DESIGNATION Разливочное устр-во	two cars		
	TUNDISH GATE EQUIPMENT			
1	CONTROL CABINET HYDRAULIC	1	TLC optional	контр.помещение гидравлики
2	CONTROL CABINET STRAND (MLC)	3		контр. разливочное устройство
3	OPERATOR STATION TUNDISH GATE	*		операторская
4	OPERATOR STATION CENTRAL HYDRAULIC POWER UNIT	1		центр. гидравлика, операторский пульт
5	TERMINAL AND SIGNAL AMPLIFIER BOX	2		смещенный терм.
6	TEST PENDANT	2		контроль, выключатель
7	PROCESS PARAMETER ACCESS UNIT (LAPTOP)	1		процесс параметрирования
9	HARD COPY PRINTER		Option	принтер
10	LASER PRINTER (GRAPHICS)		Option	лазерный принтер
11	DATA STORAGE UNIT		Option	банк данных
20	CENTRAL HYDRAULIC POWER UNIT	1		центр. снабжение гидравлики.
21	VALVE MANIFOLD	12		} коллектор
22	CONNECTION MANIFOLD	2		
23	EMERGENCY ACCUMULATOR WITH SAFTEY BLOCK	2		аккум. блок.
24	HYDRAULIC CYLINDER WITH STROKE MEASURING SYSTEM MWS	12		гидравл. цилиндр
28	GAS BOX	6		газовый блок
29	GAS HOSES	Set		набор газовых шлангов
30	TUNDISH GATE 13QC	24		шиберное устройство
31	SUBMERGED NOZZLE HOLDER (with counter weight)	12		погруженное сопло
34	BASE PLATE	36		основная плита
-	REFRACTORIES (SETS)	180		наборы огнеупоров
	TUNDISH GATE PREPARATION AREA			
40	TEST HYDRAULIC UNIT T01	1		контроль гидравлики
41	HYDRAULIC CYLINDER S80/80	1		гидравлич. цилиндр
46	ASSEMBLY CAR	1		комплект тележек
47	ASSEMBLY RACK	12		комплект стоек
48	MOUNTING DEVICE FOR MIDDLE PLATE	3		комплект монтажных стоек для средней платы
49	ASSEMBLY AND TESTING DEVICE FOR EXPANSION COMPENSATOR	1		контроль компенсатора
50	RAMMING TOOL (FOR NOZZLE)	1		набивка для сопла
51	SET OF TOOLS	1		набор инструментов
	GENERAL ACCESSORIES FOR TUNDISH GATE			
100	TERMINAL BOX SIGNAL CABLE ON VALVE MANIFOLD	12		сигнальный кабель
101	SIGNAL CABLE COMPL.	12		блок
102	SIGNAL CABLE	Set		комплект сигнальн. кабелей.
103	PENDANT	1		выключатели
104	GENERAL EMERGENCY SHUT		Others	
107	LIMIT SWITCH (TUNDISH CARS)		Others	
111	TEST- AND CHARGING VALVE FOR ACCUMULATOR	1		контр. аккумулятора
112	HP - HOSES	Set		шланги

* Basic engineering by Stopinc

ЭП2-770-35-6

Требования для работы с отливкой

INTERSTOP
STOPINC AKTIENGESELLSCHAFT
CH-6341 BAAR

REQUIREMENTS FOR TS-OPERATION ON CASTER
FUEL, AIR, GAS, ELECTRICITY, ETC.
топливом, воздухом, газом, электричеством и т.д.

CUSTOMER : CIS via ROKOP
PROJECT NO: 2014/419
DATE : 03/13/95 Ba.

Fuel Consumption, Energy requirements within the Caster area	Given data are based on a 6-strand Caster Данные, базируемые на 6-ручьевую установку
Max. мощность эл. двигателя для гидравлической системы Max. el. power requirements for hydraulic systems	approx. 25kW ≈
Normal el. power requirements for hydraulic systems - Нормальн. эл. двигатель для гидравлики	approx. 14kW ≈
Эл. двигатель для привода и регулятора процесса. El. power requirements for drives and process controls	5kVA - 110/220VAC
Макс. охлаждение воды для системы гидравлики Max. cooling water requirements for hydraulic systems	л/мин на макс. расход 30l/min. at max. 30 degr. Centigrade
Average required amount of cooling water среднее кол-во охлажденной воды	15-25l/min. at 30 degrees градусов л/мин на
Макс. теоретический расход аргона (нитрогена) Max. theor. Argon (Nitrogen) - Consumption	6 x 46Nl (theor. peak situation during a tube change)
Usual average Argon (Nitrogen) - Consumption обычный расход аргона	6 x 9Nl теор. пиковой ситуации в течение смены трубы
Макс. расход сжатого воздуха для промежуточного разливочного устройства Max. compressed air Consumption for tundish gates	none none | нет
Average compressed air Consumption for tundish gates	
Среднее кол-во сжатого воздуха для разливочного устройства ~~Average compressed air consumption for ladle gates~~	~~160m3/hour at 4bar (On casting turret side only)~~
Требования по нитрогену (только для зарядки аккумулятора) Nitrogen requirements (only for hydraulic accu charging)	газ/баллона бар под давлением 1-2 Gas bottles, 200bar initial filling pressure
Гидравлическая жидкость для начального заполнения Hydraulic fluid for initial filling (after rinsing of pipeline system) (после промывки системы трубопроводов)	approx. 500 Liters, Quintolubric 822-300
Lubricants Смазочные средства	none нет
Heat losses from Controller Cabinets situated in the el. Control Room Для контроля контрольного помещения	approx. 1.5kW

рекомендации

Техническая характеристика энергоносителей

ЭП2-770-35-9 CASTDAT6

Требования на подготовку зоны

INTERSTOP
STOPINC AKTIENGESELLSCHAFT
CH-6341 BAAR

REQUIREMENTS AT TS-PREPARATION AREA
FUEL, AIR, OXYGEN, ELECTRICITY, ETC.
топлива, воздуха, кислорода, электричества и т.д.

CUSTOMER : CIS via ROKOP
PROJECT NO: 2014/419
DATE : 03/13/95 Ba.

Fuel Consumption, Energy requirements at tundish gate preparation area	Given data are based on a 6-strand Caster
El. power requirements for test hydraulic unit Эл.двигатель для проверки гидравлики	≈ approx. 3kW
El. power requirements for lightning and tools	≈ approx. 2kW
Gas requirement (1 Connection) потребление газа (1 включение)	only for irregular cleaning purposes } Только для нерегулярной очистки
Oxygen requirement (1 Connection) потребление (—"—)	only for irregular cleaning purposes }
Water requirement потребление воды	2-5m3/ Day (день)
Compressed air сжатый воздух	Только в целях нерегулярной очистки only for irregular cleaning purposes
Hydraulic fluid for initial filling Гидравл. жидкость для начального заполнения	≈ approx. 30l Mineral fluid, HLP ISO VG68 (л. минеральн. жидкости)
Lubricants смазка	none нет
Tools and mortars Инструменты и строительные р-ры.	see on specific sheets см. специф. описание

Техническая характеристика (продолжение)

ЭП2-770-35-10

Список двигателей

INTERSTOP
STOPINC AKTIENGESELLSCHAFT
CH-6341 BAAR

MOTOR LIST
for Tundish- and Ladle Gate drives
для настройки и

CUSTOMER : CIS via ROKOP
PROJECT NO:2014/419
DATE :March13,1994/Ba.

ITEM	Применение APPLICATION	Тип / данные TYPE / DATA			Замечание REMARKS
1+2	насос/мотор на центральной MAIN PUMP MOTORS ON CENTRAL HYDRAULIC PRESSURE SUPPLY UNIT (AO2) гидравлике	AC MOTOR 380-420VD 660VY 440-480VD	11/12,5kW 50Cycl. 1455 Rev/min 60Cycl. 1755 Rev/min	ASEA/ABB	TOTAL 2 PCS. всего
		MBT 160M MK 161 004-BD INSUL. CLASS F IP55 B5			
3	Бай-пасс(насос) BY-PASS PUMP CIRCUIT ON CENTRAL HYDRAULIC PRESS. SUPPLY UNIT (AO2) на гидравлике	AC MOTOR 380/415V 440/460V	1,5/1,7kW 50Cycl. 1500Rev/min 60Cycl. 1800Rev/min	HYDAC	TOTAL 1 PC.
		INSUL. CLASS B IP54 B14			
4	PUMP MOTOR ON TUNDISH GATE TEST UNIT (TO1) (TUNDISH PREPARATION AREA) Насос с эл.двигателем на разливочном устройстве	AC MOTOR 230VD/400VY 254VD/440VY	2,2/2,6kW 50Cycl. 1450Rev/min 60Cycl. 1740Rev/min	RÜETSCHI	TOTAL 1 PC
		AR 100 L-4S INSUL. CLASS F IP54 B14C (D=160mm)			

двигатели

Техническая характеристика (продолжение)
Эл2-ТТО-35-11

MOTRLIST.PM4

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Customer : Red October via Rokop
Project No.: 2014/419

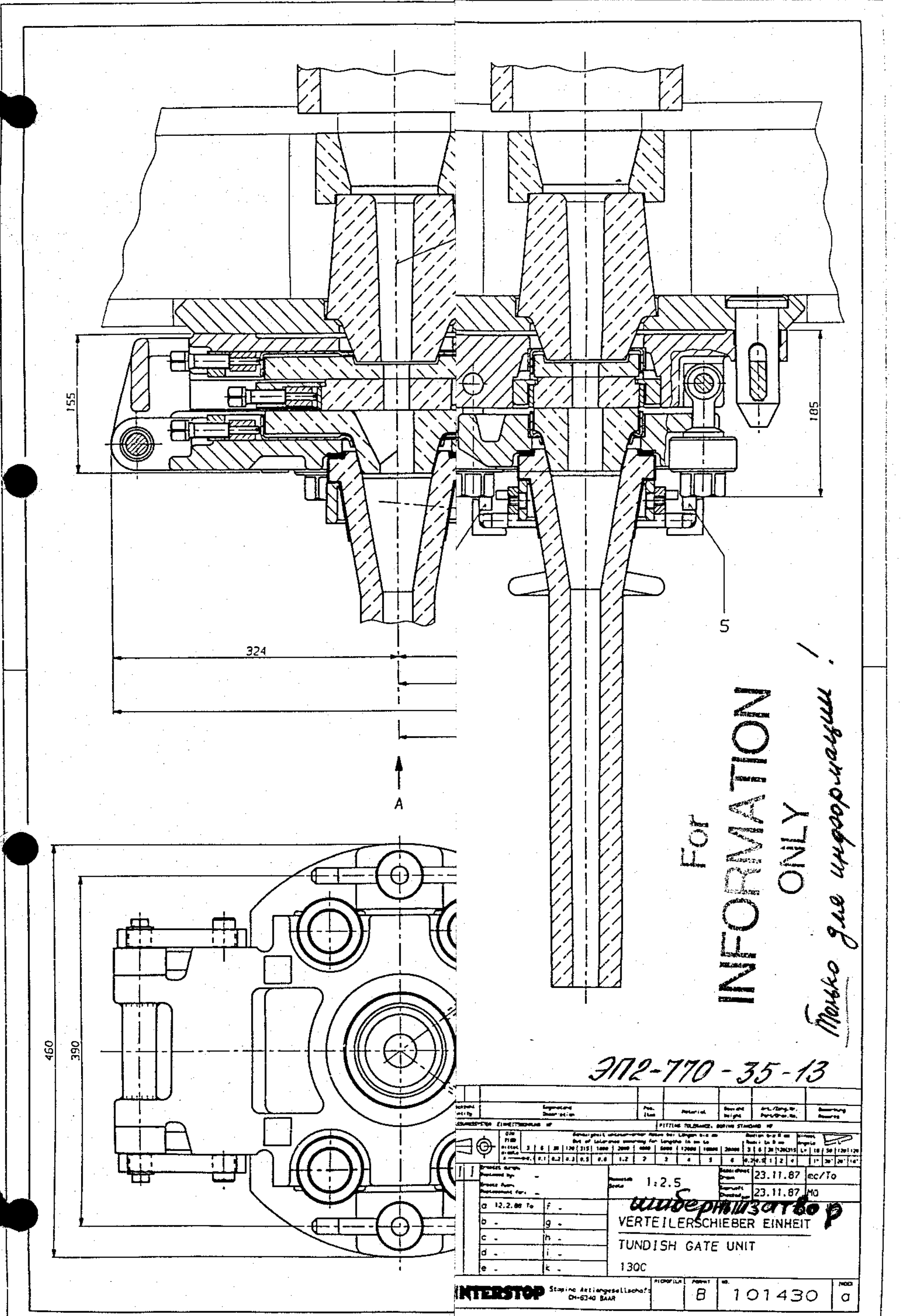
2. Mechanics 13 QC

2.1 Assembly Drawings and Parts List Сборочн. черт. и список частей (элементов)

2.2 Welding Instruction for Base Plate Сварочная инструкция базовой пластины (плиты)

2.3 Repair and Control Drawings Ремонтные и контрольные чертежи.

ЭП2-770-35-12



Scale 1:2.5

Drawn 23.11.87 mc/To

Checked 23.11.87 MO

a 12.2.88 To | f -
b - | g -
c - | h -
d - | i -
e - | k -

шиберный затвор

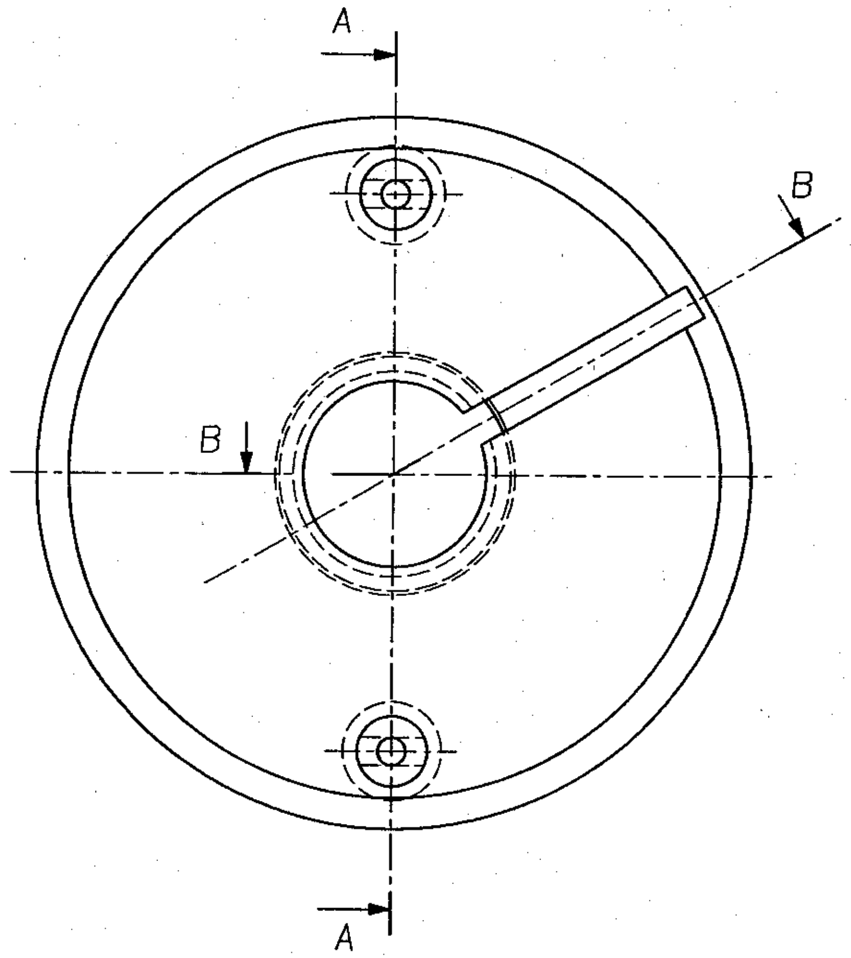
VERTEILERSCHIEBER EINHEIT

TUNDISH GATE UNIT

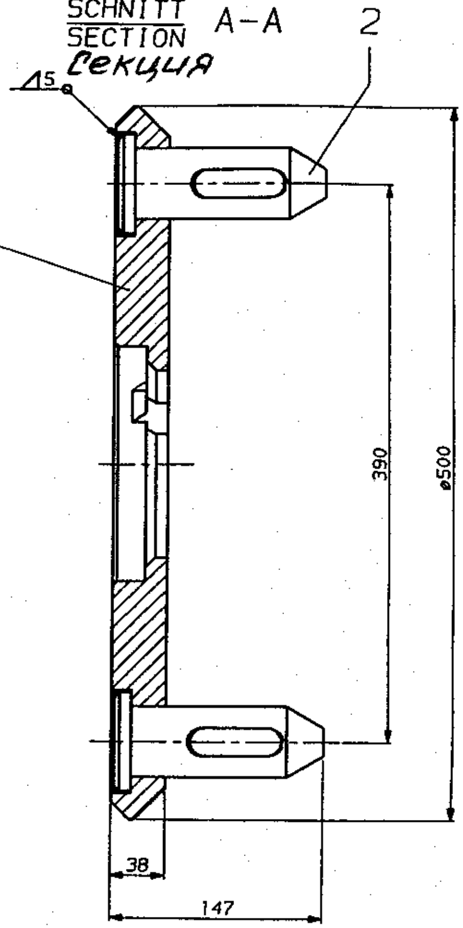
130C

INTERSTOP Stopinc Aktiengesellschaft CH-6340 BAAR

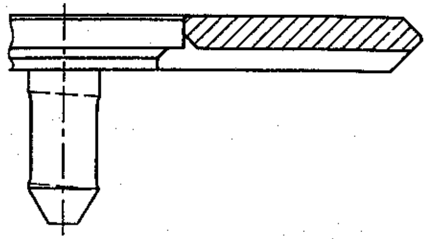
Format B | No. 101430 | Index a



Разрез
SCHNITT / SECTION A–A
Секция



Разрез
SCHNITT / SECTION B–B
Секция

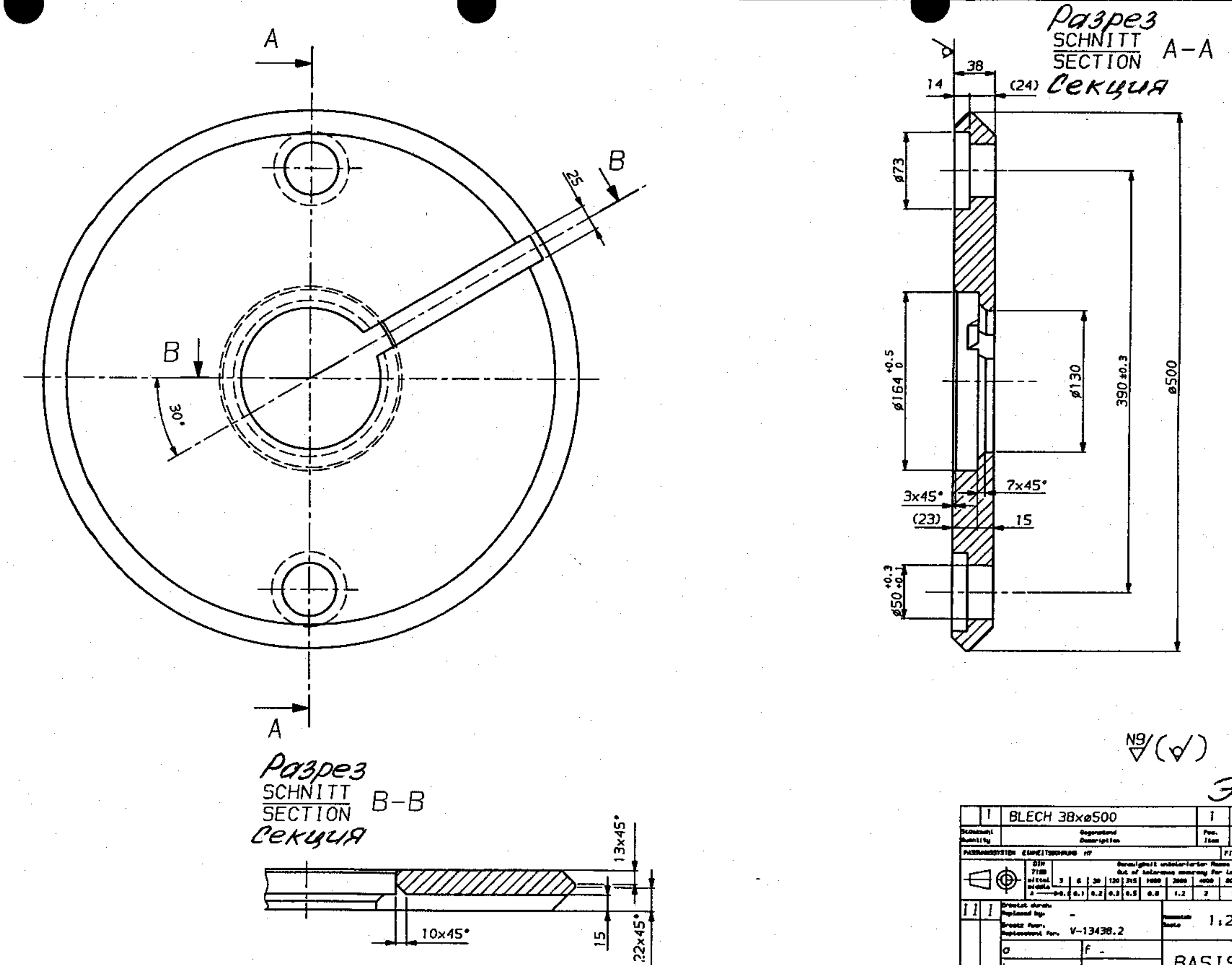


STÜCKLISTE: / PARTS LIST: 013438

57 Kg

ЭП2-770-35-14

II	I	Ersetzt durch: / Replaced by: –		Massstab / Scale 1:2.5	Gezeichnet / Drawn 8.10.87	To
		Ersatz fuer: / Replacement for: V-13438.2			Geprueft / Checked 10.10.87	MO
		a	f -	BASIS BASE 13QC	Основание затвора	
		b	g -			
		c -	h -			
		d -	i -			
		e -	k -			
INTERSTOP Stopinc Aktiengesellschaft CH-6340 BAAR				Microfilm:	Format: C	No. 103247 / Index:



N9/(✓) KANTEN GEBROCHEN / EDGES CHAMFERED

ЭП2-770-35-15

1	BLECH 38xø500	1		52		
Stückzahl / Quantity	Gegenstand / Description	Pos. / Item	Material	Gewicht / Weight	Art./Zeichg.Nr. / Part/Draw.No.	Bemerkung / Remarks

PASSUNGSSYSTEM EINHEITSBOHRUNG H7 · FITTING TOLERANCE, BORING STANDARD H7

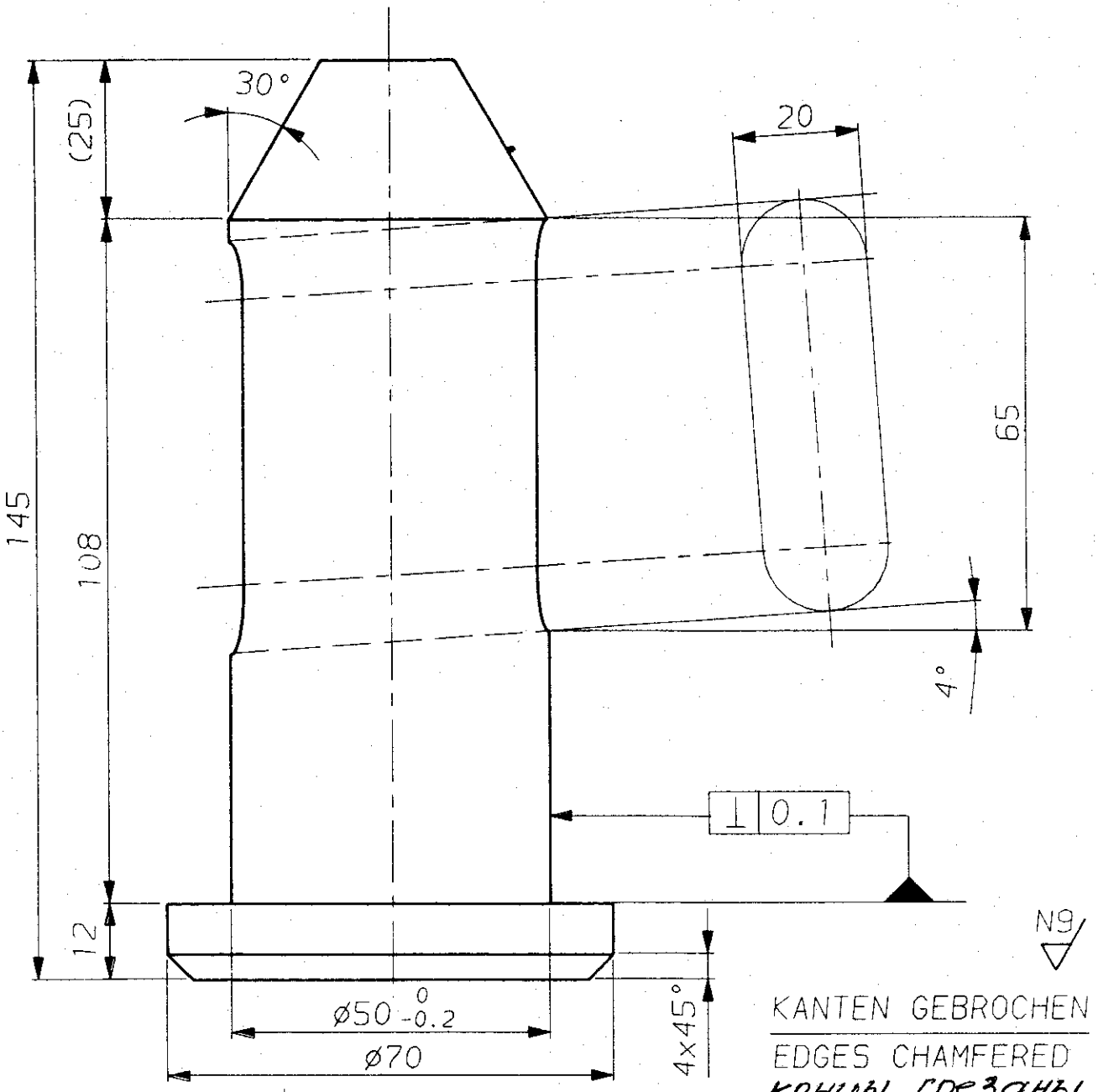
Ersetzt durch / Replaced by: -
Ersatz fuer / Replacement for: V-13438.2
Massstab / Scale: 1:2.5
Gezeichnet / Drawn: 8.10.87 To
Geprueft / Checked: 10.10.87 MO

a	f -
b	g -
c -	h -
d -	i -
e -	k -

BASISPLATTE Плита
BASE PLATE основания
13QC Тарелка

INTERSTOP Stopinc Aktiengesellschaft CH-6340 BAAR

Format: C · No.: 103248



Stückzahl Quantity	Gegenstand Description	Pos. Item	Material	Gewicht Weight	Art./Zchg.Nr. Part/Draw.No.	Bemerkung Remarks
			круглая сталь	Материал	Вес	
1	RUNDSTAHL Ø70x145	1	Ck 45	2	_	_

PASSUNGSSYSTEM EINHEITSBOHRUNG H7 — FITTING TOLERANCE, BORING STANDARD H7

DIN 7168 mittel middle	Genauigkeit bearbeiteter, untolerierter Masse bei Längen bis mm / Out of tolerance accuracy for Lengths in mm to												Radien bis R mm / Radii to R mm					Winkel Angels				
	3	6	30	120	315	1000	2000	4000	6000	12000	16000	20000	3	6	30	120	315	L=	10	50	120	120
± →	0.1	0.1	0.2	0.3	0.5	0.8	1.2	2	3	4	5	6	0.2	0.5	1	2	4		1°	30'	20'	10'

I I	I	Ersetzt durch: Replaced by: _	Massstab Scale 1:1	Gezeichnet Drawn	12.11.87 To
		Ersatz fuer: Replacement for: _		Geprueft Checked	16.11.87 Mü

Болт (Палец)

BASISBOLZEN

BASE BOLT

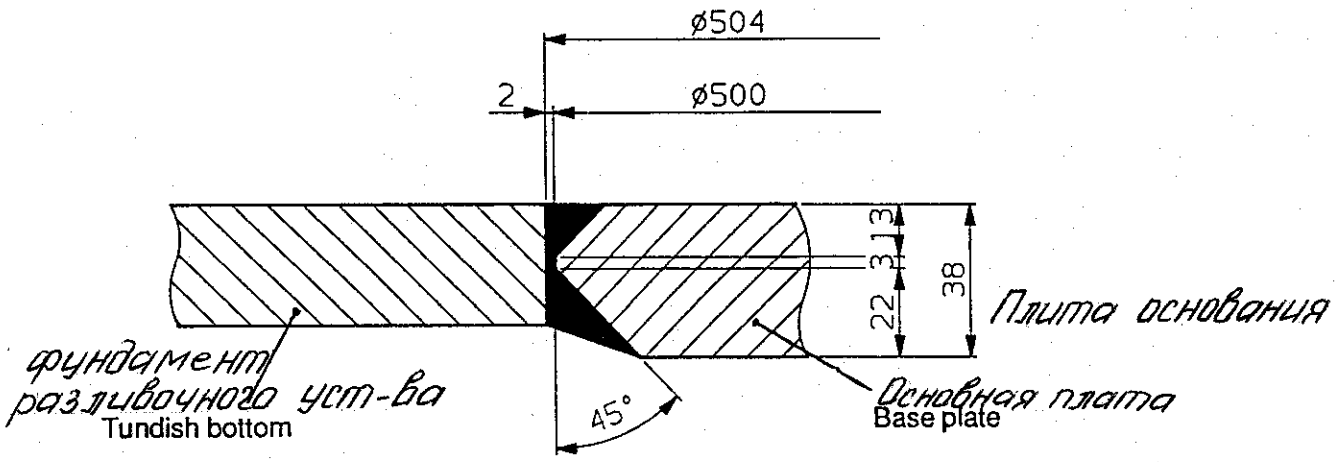
ЭП2-770-35-16

NORMTEIL 13QC

INTERSTOP Stopinc Aktiengesellschaft CH-6340 BAAR

MICROFILM	FORMAT	NO.	INDEX
(M)	E	N13447.4	_

INTERSTOP STOPING AKTIENGESELLSCHAFT CH-6340 BAAR	Технические требования **Welding of Base** на сварку основания	**13QC** Date : 05. 1995 | Page : 1 / 1



Материал **Material :** Жаропрочная конструкционная сталь
High temperature structural steel :

H II	(1.0425) or
WStE 285	(1.0487) or
ASt 41	(1.0426) or

Материал основания – Tundish bottom material

Электроды **Electrodes:** Depending on bottom material : Прочность материала основания

DIN 8529	E SY42 76 Mn B
ISO 2560	E 515 B 20
AWS / ASME	SFA-5.1 / E 7018-1
or	
DIN 8575	E Kb CrMo B 1 20
ISO 3580	E 1 CrMo B 20
AWS / ASME	SFA-5.5 / E 8018-B 2

or

Базовые низколегированные или высокопрочные электроды – basic, low alloyed or high strength electrodes

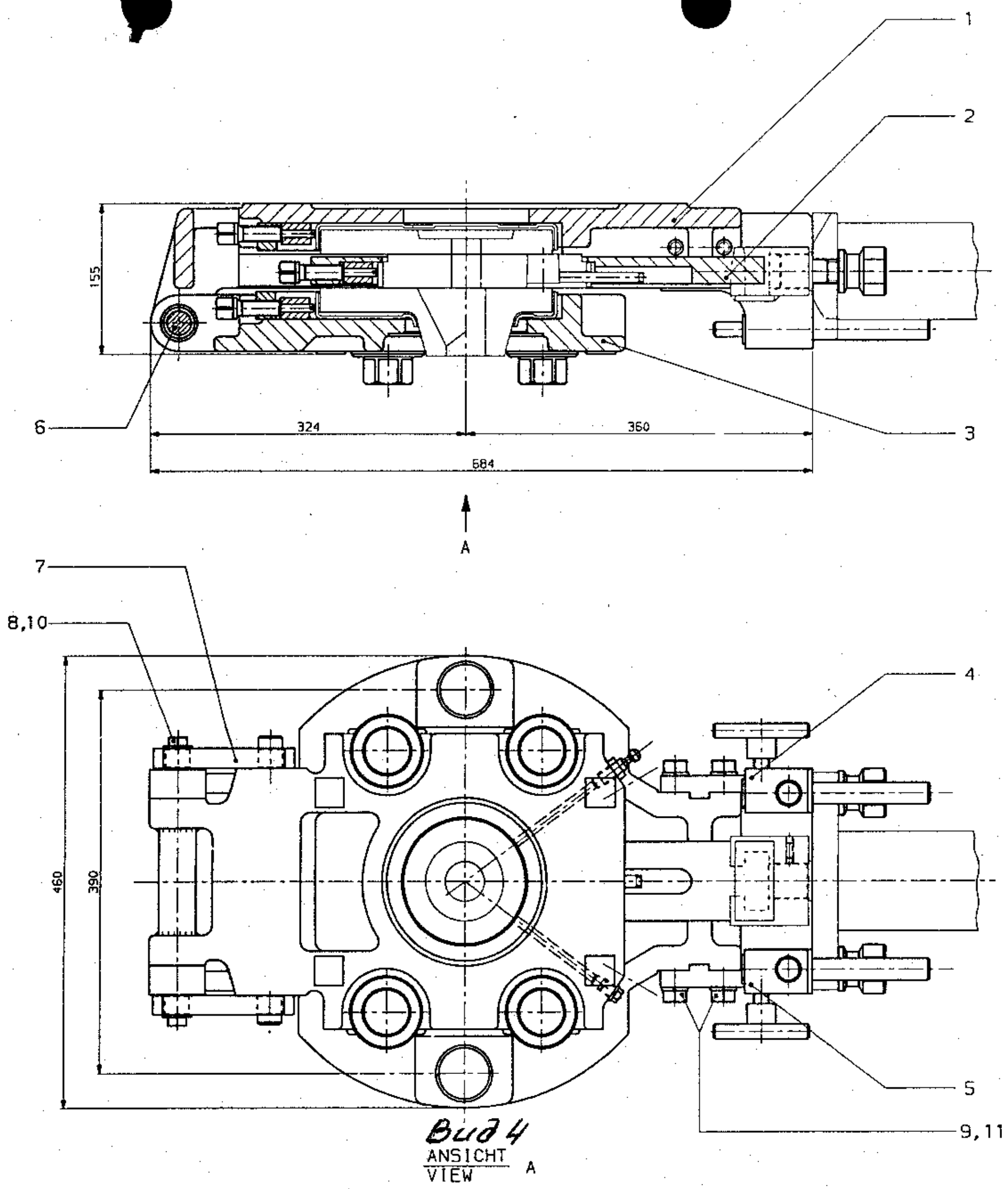
Диаметр электродов
Electrode diameter :
для шва (части)
for root layer ~ approx. 2 -3 mm
for following layers ~ approx. 5 - 6 mm
для полного шва

Инструкция **Instruction** :

1. Нагреть фундамент уст-ва до
Heat the tundish bottom and the base to 150° - 200°C (302° - 392° F)
Important: This temperature must be maintained during the whole welding process. Данная t° должна поддерживаться в течение всего сварочного процесса
2. Weld the root layer on one side. Шов сваривать с одной стороны
3. Grind the other side of the root layer clean. Другие оставлять чистыми
4. Apply root layer on other side.
5. Apply following layers alternating inside and outside.

Рекомендуемая толщина стенки
It is recommended for a wall thickness of over 60mm to use for the first 2 - 3 layers the following electrodes: для следующих электродов
DIN 1913 E 4343 B 10
ISO 2560 E 434 B 20 (H)

ЭП2-770-35-17



ЭП2-770-35-18

117062	130C	112	DEHNUNGSKOMPENSATOR NIMONIC
101433	130C	112	DEHNUNGSKOMPENSATOR X22
TEILENUMMER / PART NUMBER	TYP / TYPE	GEWICHT kg / WEIGHT	BEMERKUNGEN / REMARKS

a 12-FEB-88 TONLOO
b 13-FEB-91 MUELLER
c 12-JAN-95 MUELLER

1:2.5

12-NOV-87 mc/To
16-NOV-87 Mu

Узел
VERTEILERSCHIEBER
TUNDISH GATE
130C шиберного затвора

INTERSTOP Stopinc AG CH-6341 BAAR

B 101432 c

Stopinc Aktiengesellschaft

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INTERSTOP

Спецификация к черт.

Order Parts List

настройка?

TUNDISH GATE 13QC

EXPANSION COMPENSATOR X22

рост возмещение?

Часть

Part no.: **101433** Project no. 2014/419 проект N

Dwg no. : B101432 ROKOP

kg/piece: 112

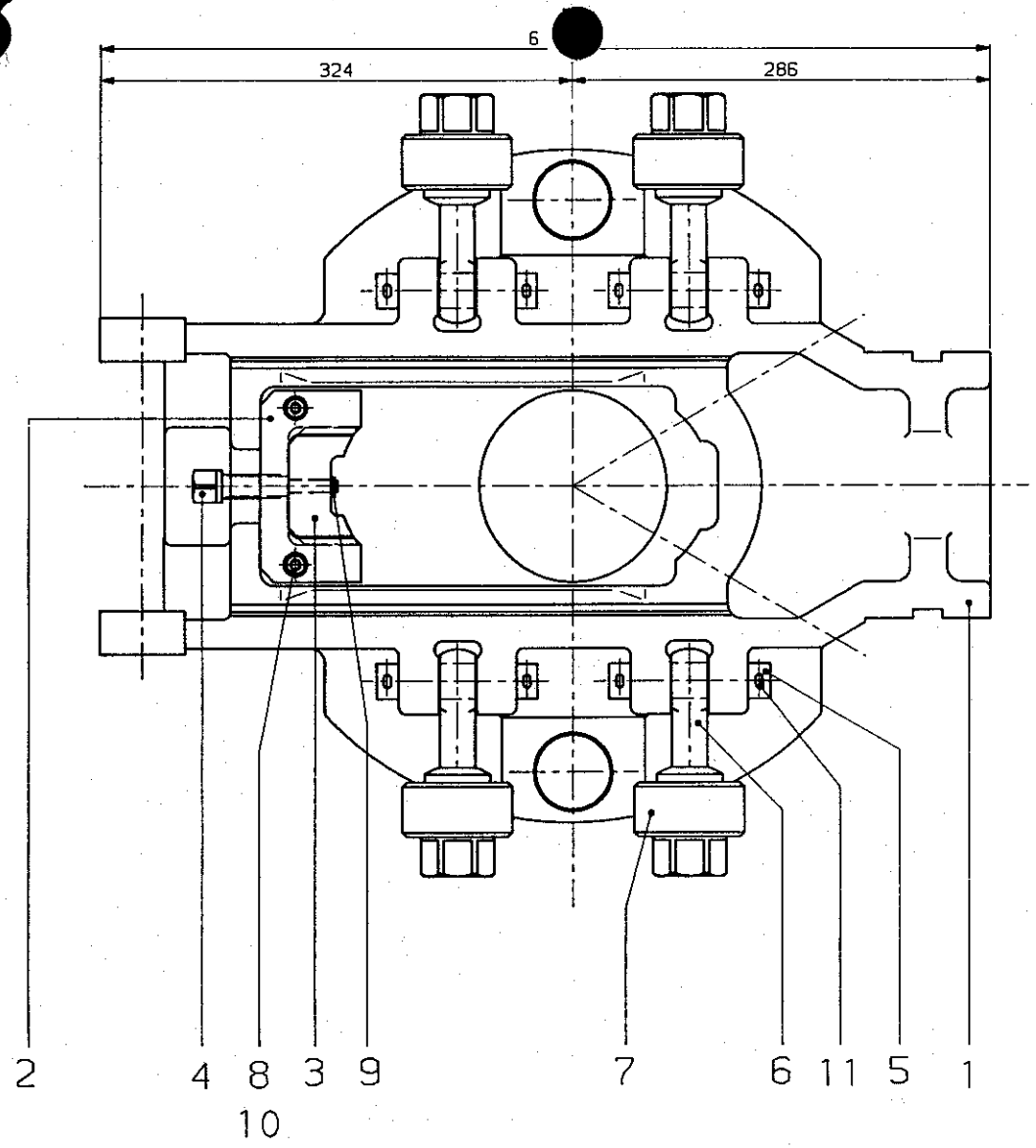
Page : 1
Print : 09/06/95
Issue : 05/04/95
Doc no. : 8383

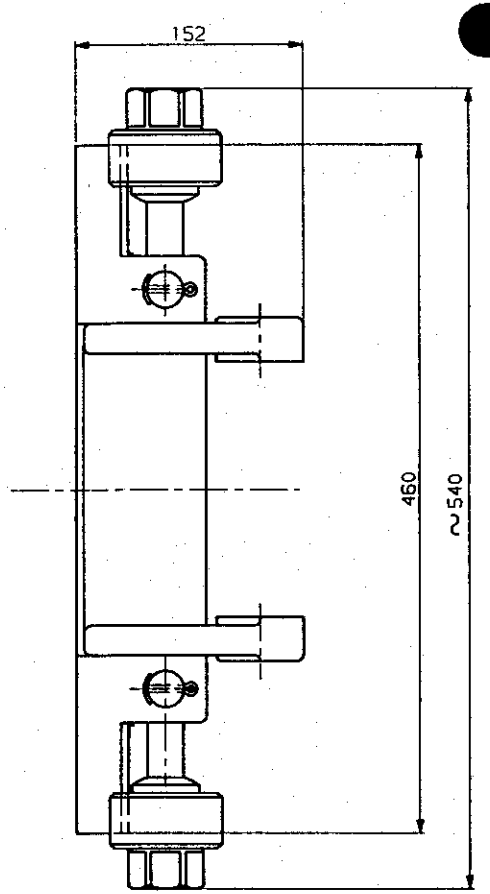
3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
		Designation Описание				шт.
1	P	**101440** HOUSING COMPL. 13QC EXPANSION COMPENSATOR X22	C101439 Корпус в сборе		1	pcs
2	P	**101442** MIDDLE PLATE FRAME COMPL. 13QC	D101441 Средняя плата (компл.)		1	pcs
3	P	**101444** HOUSING COVER COMPL. 13QC	D101443 Крышка корпуса		1	pcs
4	P	**101446** CYLINDER BRACKET LEFT COMPL. 13QC	D101445 Комплект цилиндров (левый)		1	pcs
5	P	**101448** CYLINDER BRACKET RIGHT COMPL. 13QC	D101447 Комплект цилиндров (справа)		1	pcs
6		**014230** AXLE 25X271 13QC	N-14230.4 Ось		1	pcs
7		**013752** JOINT BRACKET 13QC	N-13752.4 Стыковые соединения	Планка (соедин.)	2	pcs
8		**102101** HEXAGON HEAD SCREW M12X16 DIN 933-8.8 винты			2	pcs
9		**102113** HEXAGON HEAD SCREW M16X40 DIN 933-8.8 винты			4	pcs
10		**102276** WASHER A 13 DIN 9021-STEEL прокладка (шайба)			2	pcs
11		**102311** RETAINING WASHER "SCHNORR"-VS16 SPRING STEEL пружинная сталь (шайба)			4	pcs

ЭП2-770-35-19

End of list





ЭП2-770-35-20

117061	13QC	61	DEHNUNGSKOMPENSATOR NIMONIC
101440	13QC	61	DEHNUNGSKOMPENSATOR X22
TEILENUMMER PART NUMBER	TYP TYPE	GEWICHT WEIGHT kg	BEMERKUNGEN REMARKS

11	1	Ersatz durch Replaced by: -	Massstab Scale	1:2.5	Gezeichnet Drawn	16-NOV-87	To
		Ersatz fuer Replacement for: -			Geprueft Checked	16-NOV-87	Mu
		a 12-FEB-88 TOALDO					
		b 12-JAN-95 MUELLER					

GEHAEUSE KOMPL.
HOUSING COMPL.
13 QC Кожух Корпус

INTERSTOP Stopinc AG CH-6341 BAAR | MICROFILM | FORMAT C | NO. 101439 | INDEX b

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 31 28 64, Telex 862128 ist ch

INTERSTOP

Спецификация к черт.
Order Parts List

жил. ст-во полный
HOUSING COMPL. 13QC
EXPANSION COMPENSATOR X22 компенсатор

Part no.: 101440 проект Project no. 2014/419
Dwg no. : C101439 ROKOP
kg/piece: 61

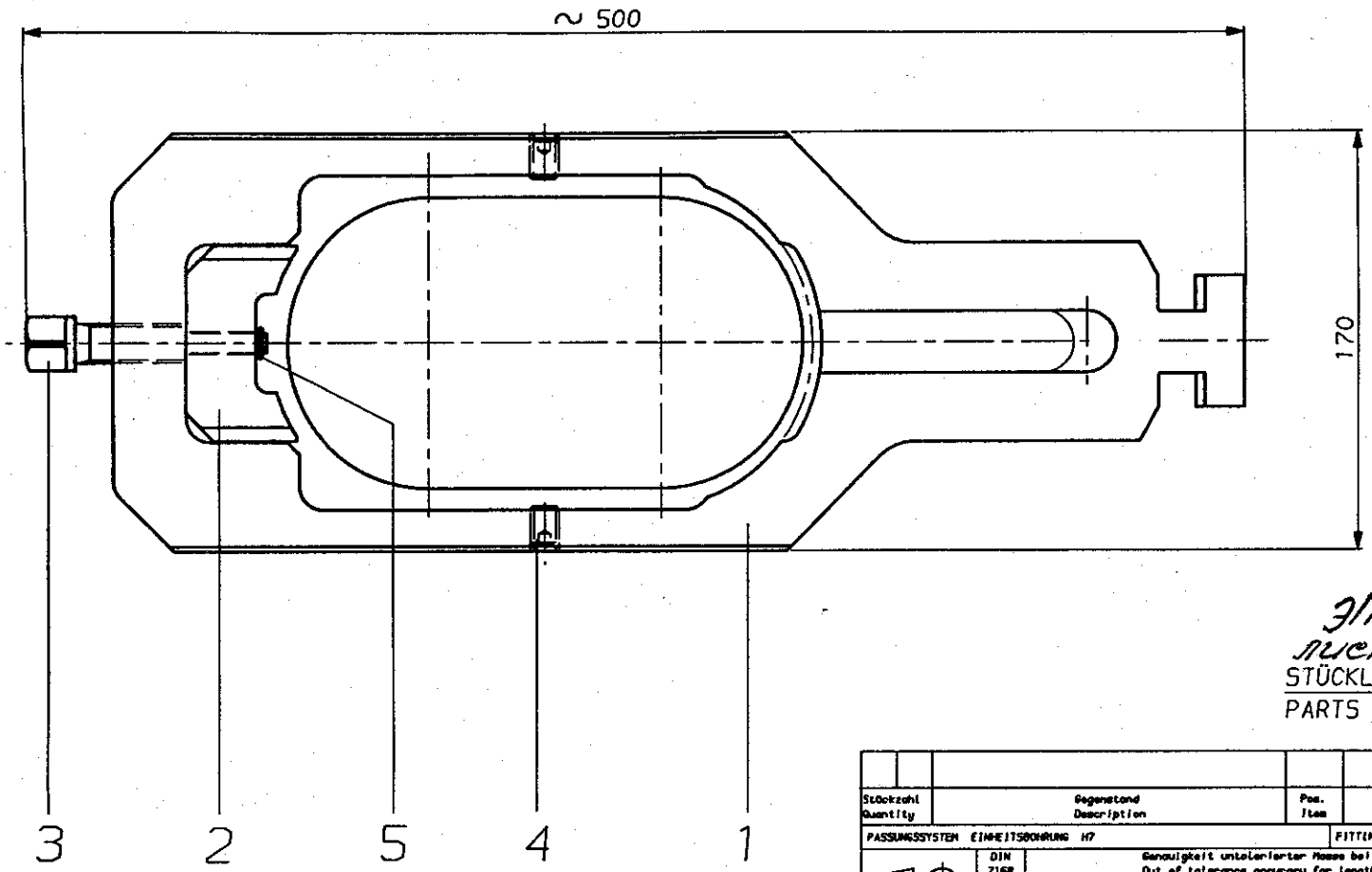
Page : 1
Print : 09/06/95
Issue : 05/04/95
Doc no. : 8384

3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
						шт.
1		013439 HOUSING 13QC Корпус	V-13439.1		1	pcs
2		013444 GUIDING PIECE 13QC Передаточный механизм	V-13444.3		1	pcs
3		013443 THRUST PAD 13QC Сегмент подпятника	V-13443.4		1	pcs
4		014528 PRESSURE SCREW M16X80 13QC Винтовой пресс	N-14528.4		1	pcs
5		013728 BOLT 24X110 13QC Болт	N-13728.4		4	pcs
6		013755 EYE BOLT M24X110 13QC Болт с ушком	N-13755.4		4	pcs
7	P	100950 EXPANSION COMPENSATOR X22 Компенсатор 1QC-4QC/13QC/33QC	E101429		4	pcs
8		102164 HEXAGON SOCKET HEAD CAP SCREW M8X35 Винт DIN 912-8.8			2	pcs
9		102398 пружина типа SPRING TYPE STRAIGHT PIN 02X014 DIN 1481 SPRING STEEL пружинная сталь			1	pcs
10		102308 прокладка RETAINING WASHER "SCHNORR"-VS8 SPRING STEEL пружинная сталь			2	pcs
11		102393 шплинт SPLIT PIN DIN 94-5,0X36 STEEL ZINC PLATED (цинковая сталь)			8	pcs

ЭП2-770-35-21

End of list



ЭП2-770-35-22
лист N

STÜCKLISTE: 101442
PARTS LIST:

Stückzahl Quantity	Gegenstand Description	Pos. Item	Material	Gewicht Weight	Art./Zchg.Nr. Part/Draw.No.	Bemerkung Remarks

PASSUNGSSYSTEM EINHEITSBOHRUNG H7 — FITTING TOLERANCE, BORING STANDARD H7

DIN 7168 mittel middle	Genauigkeit untoleranierter Masse bei Längen bis mm / Out of tolerance accuracy for lengths in mm to												Radien bis R mm / Radii to R mm					Winkel Angels				
	3	6	30	120	315	1000	2000	4000	6000	12000	16000	20000	3	6	30	120	315	L=	10	50	120	120
s ▶	±0.1	0.1	0.2	0.3	0.5	0.8	1.2	2	3	4	5	6	0.2	0.5	1	2	4		1°	30'	20'	10'

Ersetzt durch. Replaced by: –	Massstab Scale 1:2	Gezeichnet Drawn	23.12.87	To
Ersatz fuer. Replacement for: –		Geprueft Checked	24.12.87	MQ

a –	f –
b –	g –
c –	h –
d –	i –
e –	k –

MITTELPLATTENRAHMEN KOMPL.

MIDDLE PLATE FRAME COMPL.

130C Средняя плита

		MICROFILM	FORMAT	NO.	INDEX
INTERSTOP	Stopinc Aktiengesellschaft CH-6340 BAAR		D	101441	–

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 312864, Telex 862128 ist ch

INTERSTOP

Спецификация к черт.
Order Parts List
средняя плата
MIDDLE PLATE FRAME COMPL. 13QC

Part no.: **101442** Project no. 2014/419
Dwg no. : D101441 ROKOP
kg/piece: 6.5

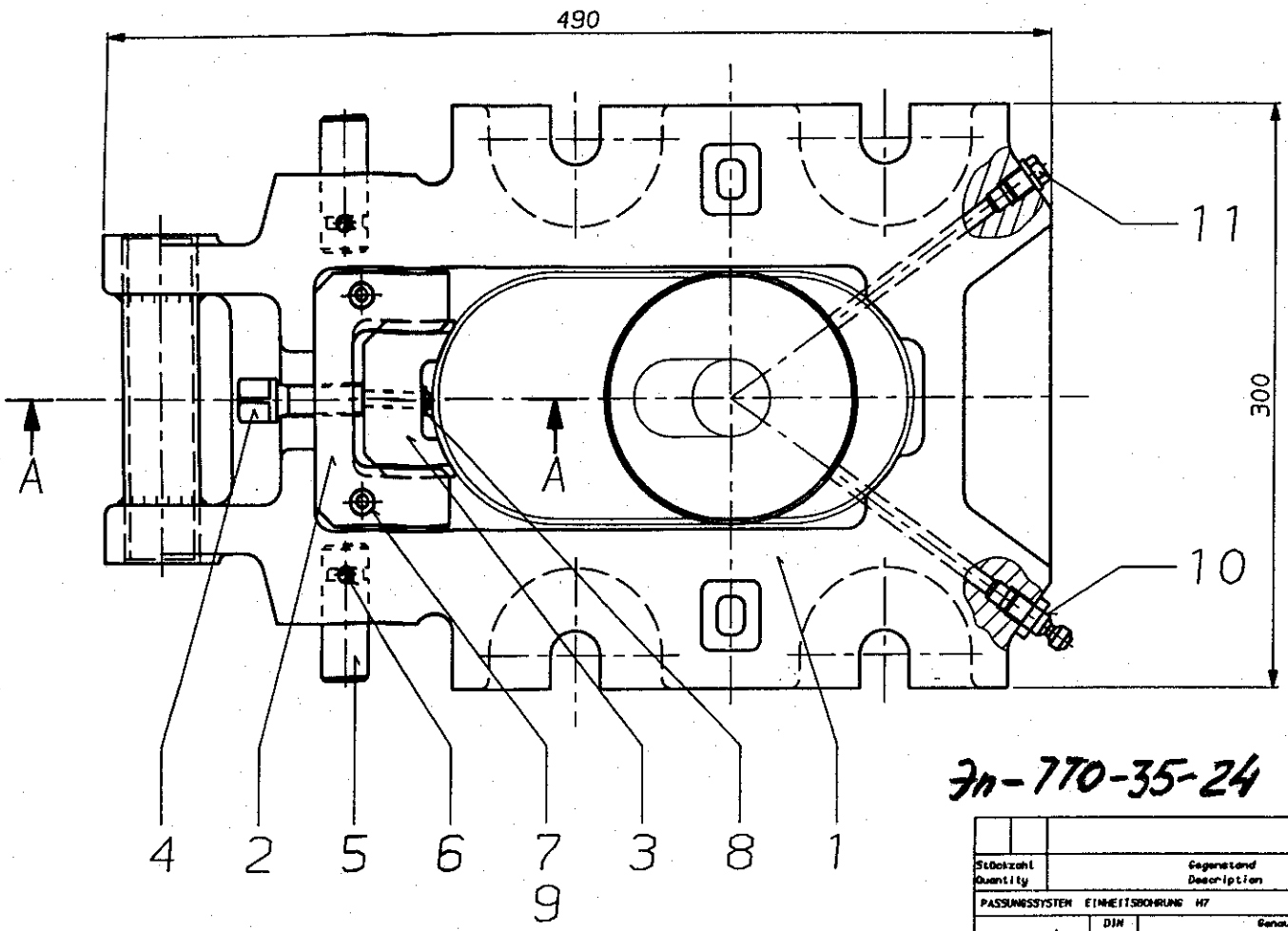
Page : 1
Print : 09/06/95
Issue : 05/04/95
Doc no. : 8385

3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
1		**013441** MIDDLE PLATE FRAME 13QC средняя плата	V-13441.1		1	pcs
2		**013443** THRUST PAD 13QC Сегмент подпятника	V-13443.4		1	pcs
3		**014528** PRESSURE SCREW M16X80 13QC Нажимной винт	N-14528.4		1	pcs
4		**102929** Набор болтов HEXAGON SOCKET SET SCREW M12X16 DIN 913-45H			2	pcs
5		**102398** SPRING TYPE STRAIGHT PIN 02X014 DIN 1481 SPRING STEEL пружинная сталь			1	pcs

ЭП2-770-35-23

End of list



Эп-770-35-24

emp.
STÜCKLISTE: 101444
PARTS LIST:
Список частей

Stückzahl Quantity	Gegenstand Description	Pos. Item	Material	Gewicht Weight	Art./Zchg.Nr. Part/Draw.No.	Bemerkung Remarks

PASSUNGSSYSTEM EINHEITSBOHRUNG H7 — FITTING TOLERANCE, BORING STANDARD H7

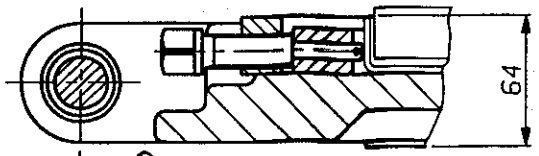
DIN 7168 mittel middle	Genauigkeit untoleranierter Masse bei Längen bis mm / Out of tolerance accuracy for lengths in mm to												Radien bis R mm / Radii to R mm					Winkel Angels				
	3	6	30	120	315	1000	2000	4000	6000	12000	16000	20000	3	6	30	120	315	L=	10	50	120	120
± →	0.1	0.1	0.2	0.3	0.5	0.8	1.2	2	3	4	5	6	0.2	0.5	1	2	4		1°	30'	20'	10'

Ersetzt durch: Replaced by: –	Massstab Scale 1:2.5	Bezeichnet Drawn	30.11.87	mc
Ersatz für: Replacement for: –		Geprüft Checked	30.11.87	MÜ

a –	f –
b –	g –
c –	h –
d –	i –
e –	k –

GEHÄUSEDECKEL KOMPL.
HOUSING COVER COMPL.
13QC Крышка кожуха (корпуса)

INTERSTOP	Stopinc Aktiengesellschaft CH-6340 BAAR	MICROFILM	FORMAT	NO.	INDEX
			D	101443	–



Разрез
SCHNITT
SECTION
Секция
A–A

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 312864, Telex 862128 ist ch

INTERSTOP

Спецификация к черт.
Order Parts List

HOUSING COVER COMPL. 13QC

Part no.: **101444** Project no. 2014/419
Dwg no. : D101443 ROKOP
kg/piece: 30.5

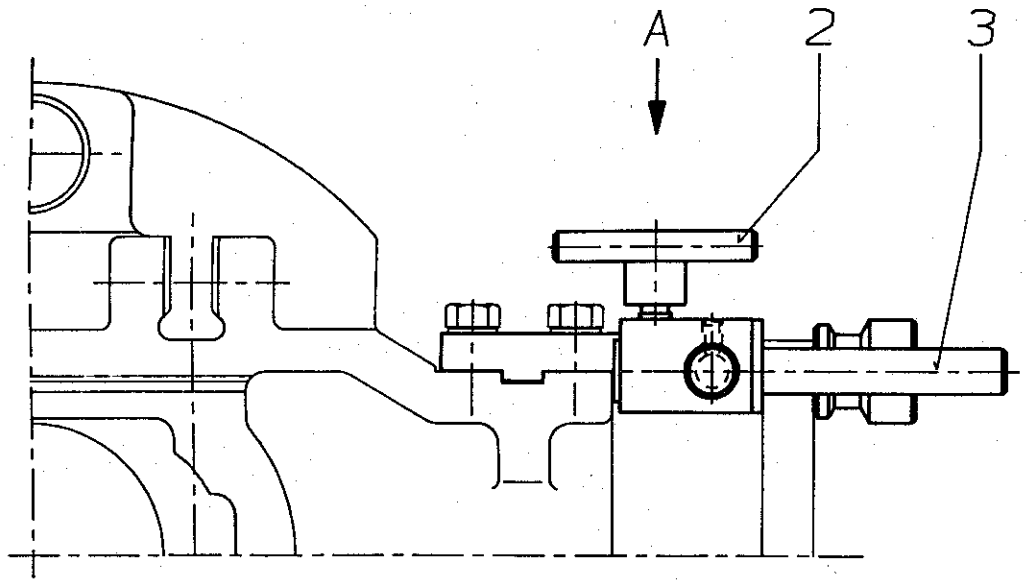
Page : 1
Print : 09/06/95
Issue : 05/04/95
Doc no. : 8386

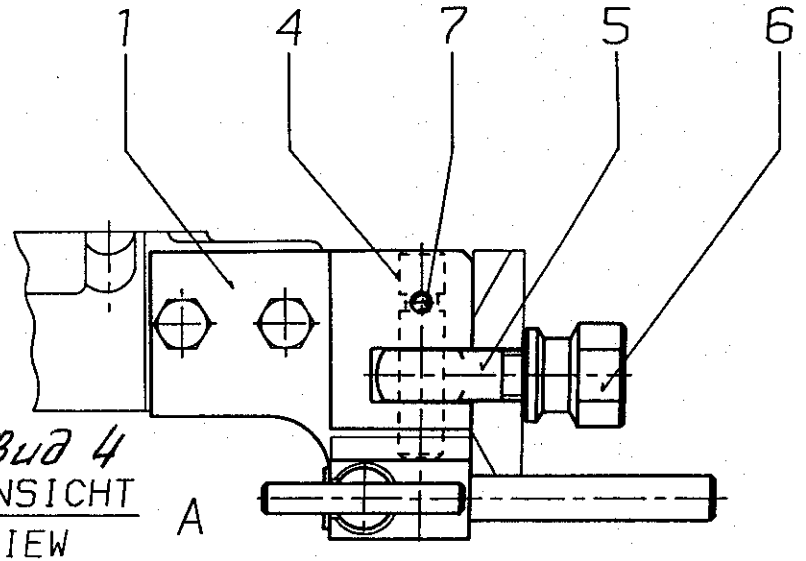
3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
1		**013440** HOUSING COVER 13QC	V-13440.1 Покрытие корпуса		1	pcs
2		**013444** GUIDING PIECE 13QC	V-13444.3 Передаточный механизм		1	pcs
3		**013443** THRUST PAD 13QC	V-13443.4 Осевая прокладка		1	pcs
4		**014528** PRESSURE SCREW M16X80 13QC	N-14528.4 Нажимной винт		1	pcs
5		**013753** BOLT 25X 70 13QC	N-13753.4 Болт		2	pcs
6		**102470** Набор винтов HEXAGON SOCKET SET SCREW M8X16 DIN 915-45H			2	pcs
7		**102164** шестигольный зажимной винт HEXAGON SOCKET HEAD CAP SCREW M8X35 DIN 912-8.8			2	pcs
8		**102398** пружина типа SPRING TYPE STRAIGHT PIN 02X014 DIN 1481 SPRING STEEL пружинная сталь			1	pcs
9		**102308** прокладка RETAINING WASHER "SCHNORR"-VS8 SPRING STEEL пружинная сталь			2	pcs
10		**102861** адаптеры типа THRU TYPE ADAPTOR DN6 SP-006-1-WR013-11			1	pcs
11		**102941** шестигольная трубка HEXAGON HEAD PIPE PLUG G1/4" DIN 910-STEEL			1	pcs

302-770-35-25

End of list





Вид 4
ANSICHT
VIEW A

Лист N
STÜCKLISTE:
PARTS LIST: 101446

Эп2-770-35-26

Stückzahl Quantity	Gegenstand Description	Pos. Item	Material	Gewicht Weight	Art./Zchg.-Nr. Part/Drw.-No.	Bemerkung Remarks

PASSUNGSSYSTEM EINHEITSBOHRUNG H7 — FITTING TOLERANCE: BORING STANDARD H7

DIN 7168 mittel middle	Genauigkeit untoleranierter Maße bei Längen bis mm / Out of tolerance accuracy for lengths in mm to												Radien bis R mm / Radii to R mm					Winkel Angels			
	3	6	30	120	315	1000	2000	4000	6000	12000	18000	20000	3	6	30	120	315	L=	10	50	120	120
± ——▶	0.1	0.2	0.3	0.5	0.8	1.2	2	3	4	5	6	0.2	0.5	1	2	4		1°	30'	20'	10'

I I I	Ersetzt durch: Replaced by:	Massstab Scale 1:2.5	Gezeichnet Drawn	21.12.87	mc
	Ersatz für: Replacement for: –		Geprüft Checked	21.12.87	MG

a 2.12.88 To	f –	Узел крепления цилиндра (левого)	
b –	g –	ZYLINDERHALTER LINKS KOMPL.	
c –	h –	CYLINDER BRACKET LEFT COMPL.	
d –	i –	130C	
e –	k –		

INTERSTOP	Stopinc Aktiengesellschaft CH-6340 BAAR	MICROFILM	FORMAT	NO.	INDEX
			D	101445	a

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 31 28 64, Telex 862128 ist ch

INTERSTOP

Спецификация к черт.

Order Parts List

CYLINDER BRACKET LEFT COMPL. 13QC

левого цилиндра

Part no.: **101446** Project no. 2014/419
Dwg no. : D101445 ROKOP
kg/piece: 5.2

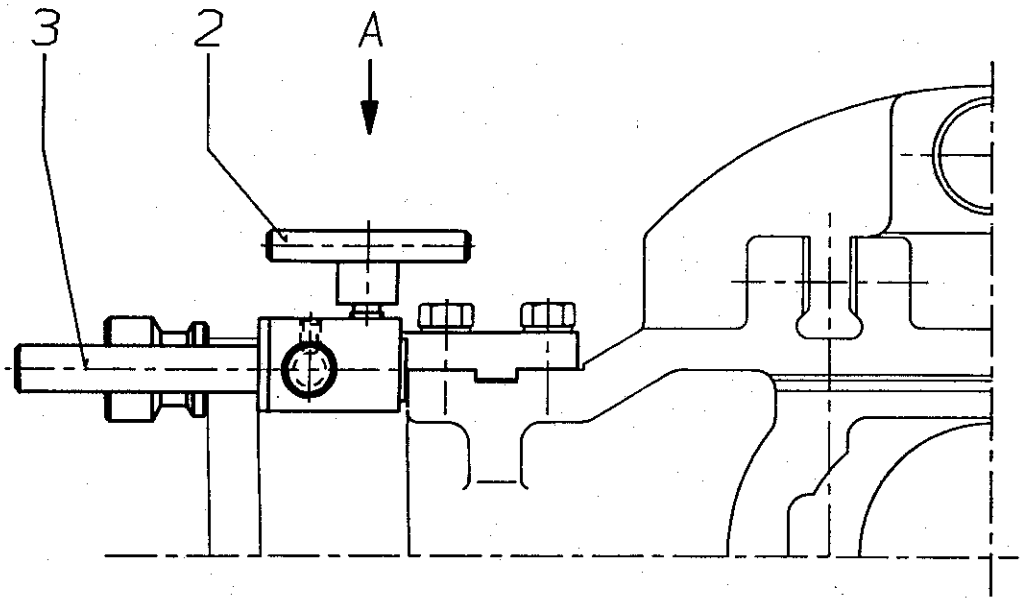
Page : 1
Print : 09/06/95
Issue : 05/04/95
Doc no. : 8387

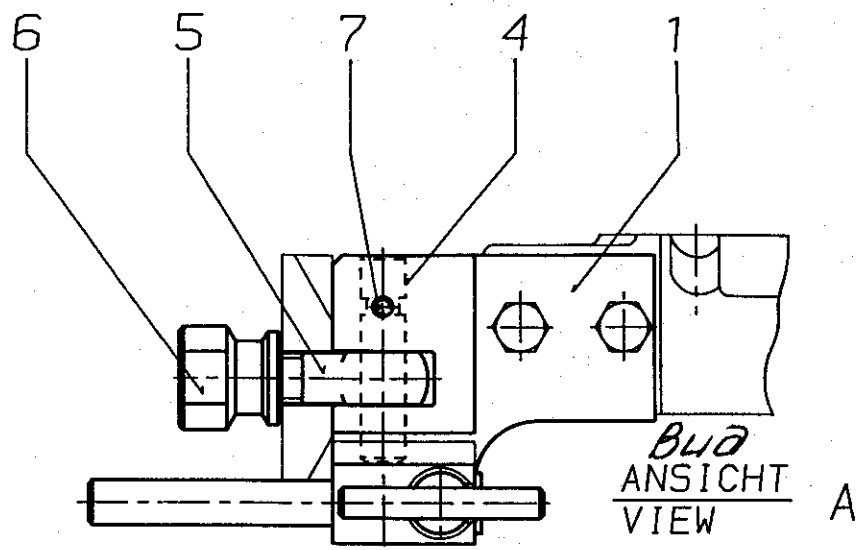
3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
1		**013446** CYLINDER BRACKET LEFT 13QC (Цилиндр (левый))	V-13446.2		1	pcs
2		**014529** T-SCREW M16 13QC (Т-образный винт)	N-14529.4		1	pcs
3	P	**013730** BOLT 22X190 13QC (Болт)	N-13730.4		1	pcs
4		**013729** BOLT 22X100 13QC (Болт)	N-13729.4		1	pcs
5		**013754** EYE BOLT M24X85 13QC (Болт с ушком)	N-13754.4		1	pcs
6		**013756** CAP NUT 13QC (Гайка)	N-13756.4		1	pcs
7		**102472** (Набор винтов (шестигольные)) HEXAGON SOCKET SET SCREW M10X16 DIN 915-45H			1	pcs

Эл2-770-35-27

End of list





Вид
ANSICHT
VIEW A

Эл2-770-35-28

Стр.
STÜCKLISTE:
PARTS LIST: 101448

Stückzahl Quantity	Gegenstand Description	Pos. Item	Material	Gewicht Weight	Art./Zchg.Nr. Part/Drav.No.	Bemerkung Remarks

PASSUNGSSYSTEM EINHEITSBOHRUNG H7 — FITTING TOLERANCE, BORING STANDARD H7

DIN 7168 mittel middle	Genauigkeit untoleranierter Masse bei Längen bis mm / Out of tolerance accuracy for lengths in mm to												Radien bis R mm / Radii to R mm					Winkel Angels				
	3	6	30	120	315	1000	2000	4000	8000	12000	16000	20000	3	6	30	120	315	L=	10	50	120	120
± ——0.1	0.1	0.2	0.3	0.5	0.8	1.2	2	3	4	5	6		0.2	0.5	1	2	4		1°	30'	20'	10'

II I	Ersetzt durch. Replaced by.	Massstab Scale 1:2.5	Gezeichnet Drawn	21.12.87	mc
	Ersatz für. Replacement for. –		Geprüft Checked	21.12.87	MO

a 12.2.88 To	f –	Узел крепления цилиндра (справа)	
b –	g –	ZYLINDERHALTER	RECHTS KOMPL.
c –	h –	CYLINDER BRACKET	RIGHT COMPL.
d –	i –	13QC	
e –	k –		

INTERSTOP	Stopinc Aktiengesellschaft CH-6340 BAAR	MICROFILM	FORMAT D	NO. 101447	INDEX a

Эл2-770-35-28

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 312864, Telex 862128 ist ch

INTERSTOP

Спецификация к черт.
Order Parts List
цилиндр (правый)
CYLINDER BRACKET RIGHT COMPL. 13QC

Part no.: **101448** Project no. 2014/419
Dwg no. : D101447 ROKOP
kg/piece: 5.2

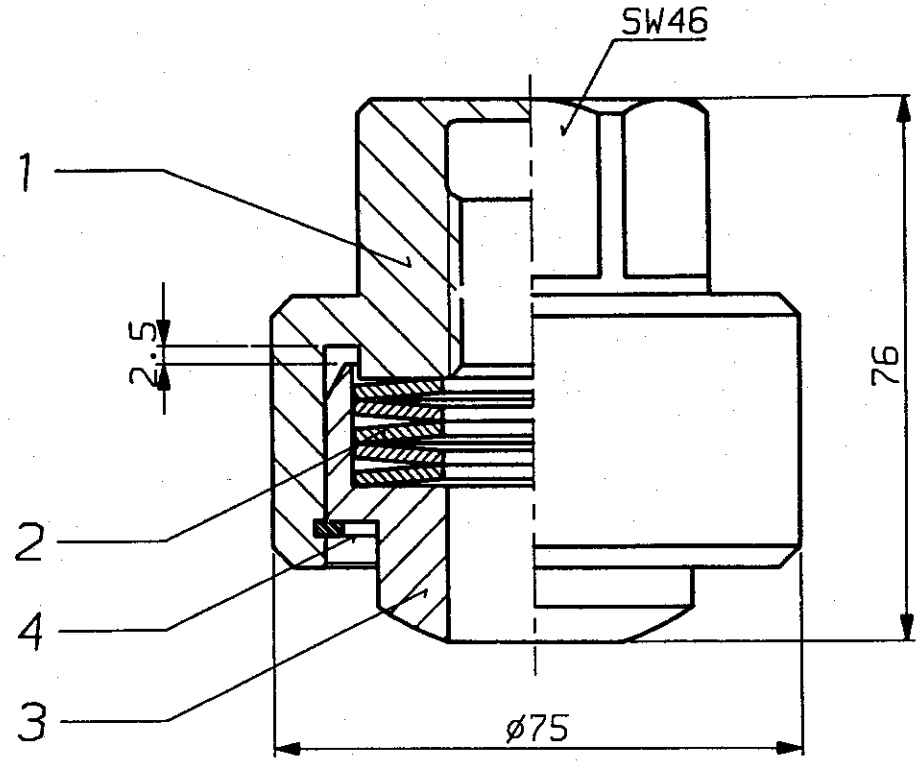
Page : 1
Print : 09/06/95
Issue : 05/04/95
Doc no. : 8388

3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
1		**013445** CYLINDER BRACKET RIGHT 13QC	V-13445.2 Цилиндр (правый)		1	pcs
2		**014529** T-SCREW M16 13QC	N-14529.4 Т-образный винт		1	pcs
3	P	**013730** BOLT 22X190 13QC	N-13730.4 болт		1	pcs
4		**013729** BOLT 22X100 13QC	N-13729.4 болт		1	pcs
5		**013754** EYE BOLT M24X85 13QC	N-13754.4 болт с ушком		1	pcs
6		**013756** CAP NUT 13QC	N-13756.4 Гайка		1	pcs
7		**102472** HEXAGON SOCKET SET SCREW M10X16 DIN 915-45H	Набор болтов (шестигольных)		1	pcs

Эп2-770-35-29

End of list



cmp.

STÜCKLISTE:
PARTS LIST: 100950

Эл2-770-35-30

				1.4		
Stückzahl Quantity	Gegenstand Description	Pos. Item	Material	Gewicht Weight	Art./Zchg.Nr. Part/Draw.No.	Bemerkung Remarks

PASSUNGSSYSTEM EINHEITSBOHRUNG H7 — FITTING TOLERANCE: BORING STANDARD H7

DIN 7168 mittel middle	Genauigkeit untolerierter Maase bei Längen bis mm / Out of tolerance accuracy for lengths in mm to												Radien bis R mm / Radii to R mm					Winkel Angels				
	3	6	30	120	315	1000	2000	4000	6000	12000	16000	20000	3	6	30	120	315	L=	10	50	120	120
± →	0.1	0.1	0.2	0.3	0.5	0.8	1.2	2	3	4	5	6	0.2	0.5	1	2	4		1°	30'	20'	10"

I I I	Ersetzt durch: Replaced by: –	Massstab Scale 1:1	Gezeichnet Drawn	7.10.87	mc
	Ersatz fuer: Replacement for: –		Geprueft Checked	7.10.87	MÜ

a 31.03.87 Ha	f –	Компенсатор расширяющийся	
b 08.03.87 Ha	g –	DEHNUNGSKOMPENSATOR	
c –	h –	EXPANSION COMPENSATOR	
d –	i –		
e –	k –	–	

INTERSTOP Stopinc Aktiengesellschaft CH-6340 BAAR	MICROFILM (M)	FORMAT E	NO. 101429	INDEX b

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 31 28 64, Telex 862 128 ist ch

INTERSTOP

Спецификация к черт.

Order Parts List

компенсатора

EXPANSION COMPENSATOR X22

1QC-4QC/13QC/33QC

Part no.: **100950** Project no. 2014/419
Dwg no. : E101429 ROKOP
kg/piece: 1.4

Page : 1
Print : 09/06/95
Issue : 05/04/95
Doc no. : 8389

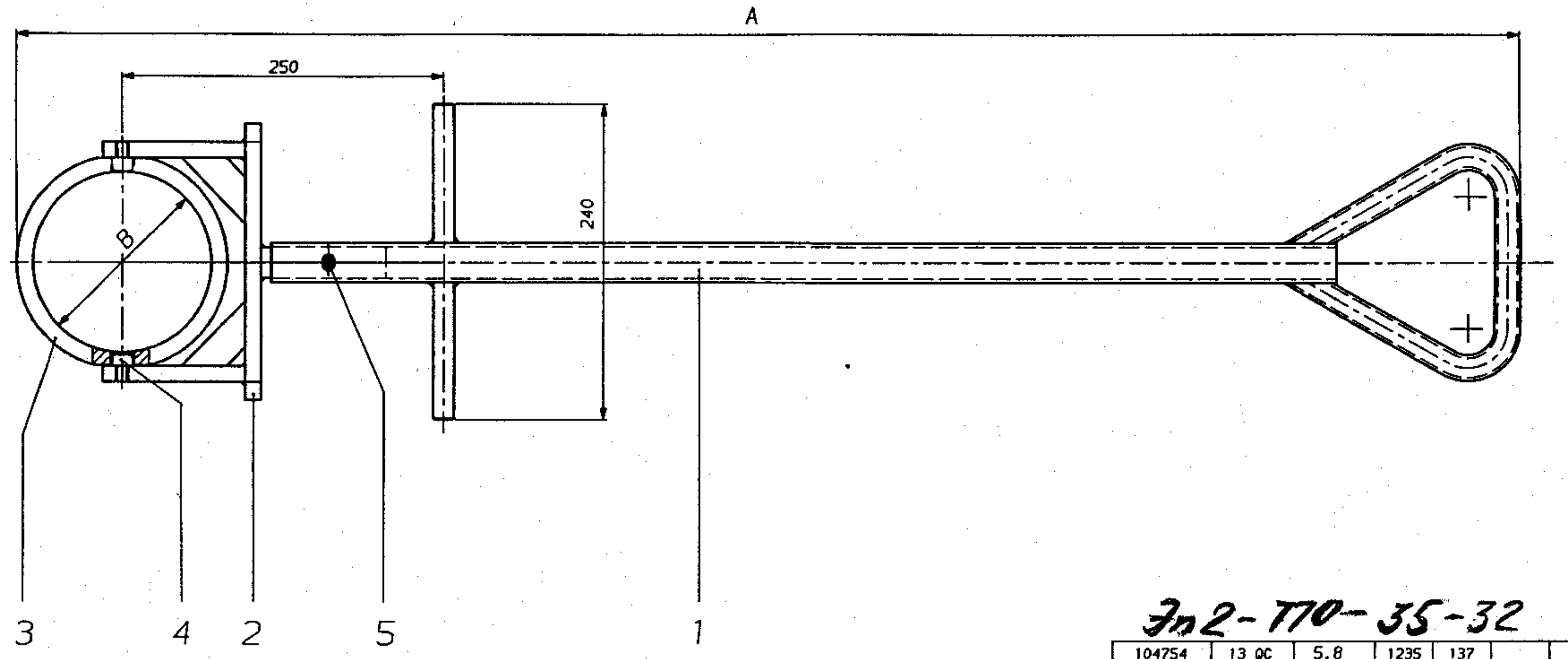
3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
1		**100949** NUT Гайка	D100949		1	pcs
2		**104788** DISC SPRING 51,4X26X2,25 Пружинный диск X22 CR MO V 12 1, Lo = 3,45 (Пружина тарельчатая)	E104788		5	pcs
3		**100948** THRUST PAD Осевая прокладка	E100948		1	pcs
4		**102932** RETAINING RING FOR BORE 60X2 DIN 472 X35 CR MO 17 фиксирующее кольцо для отверстия			1	pcs

Эп-770-35-31

End of list

6



Эп2-770-35-32

104754	13 QC	5.8	1235	137			
014212	13 QC	5.5	1160	121			
014231	13 QC	5.6	1165	137			STANDARD
TEILENUMMER PART NUMBER	TYP TYPE	GEWICHT WEIGHT	A	B	C	D	BEMERKUNG REMARKS

Massstab / Scale: 1:2.5

Gezeichnet / Drawn: 27.10.87 To

Geprüft / Checked: 30.10.87 MO

Ersetzt durch / Replaced by: –

Ersatz fuer / Replacement for: C 101438, V-14231.2

a 27.10.87 Mc	f
b 18.1.89 MO	g -
c -	h -
d -	i -
e -	k -

Держатель

ETA-HALTERUNG

SUBMERGED NOZZLE HOLDER

13QC

INTERSTOP Stopinc Aktiengesellschaft CH-6340 BAAR

Format: C | No.: 101437 | Index: b

Эп2-770-35-32

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 312864, Telex 862128 ist ch

INTERSTOP

Order Parts List

SUBMERGED NOZZLE HOLDER 13QC

Part no.: 014231 Project no. 2014/419 Page : 1
Dwg no. : C101437 ROKOP Print : 09/06/95
kg/piece: 5.6 Issue : 05/04/95
Doc no. : 8401

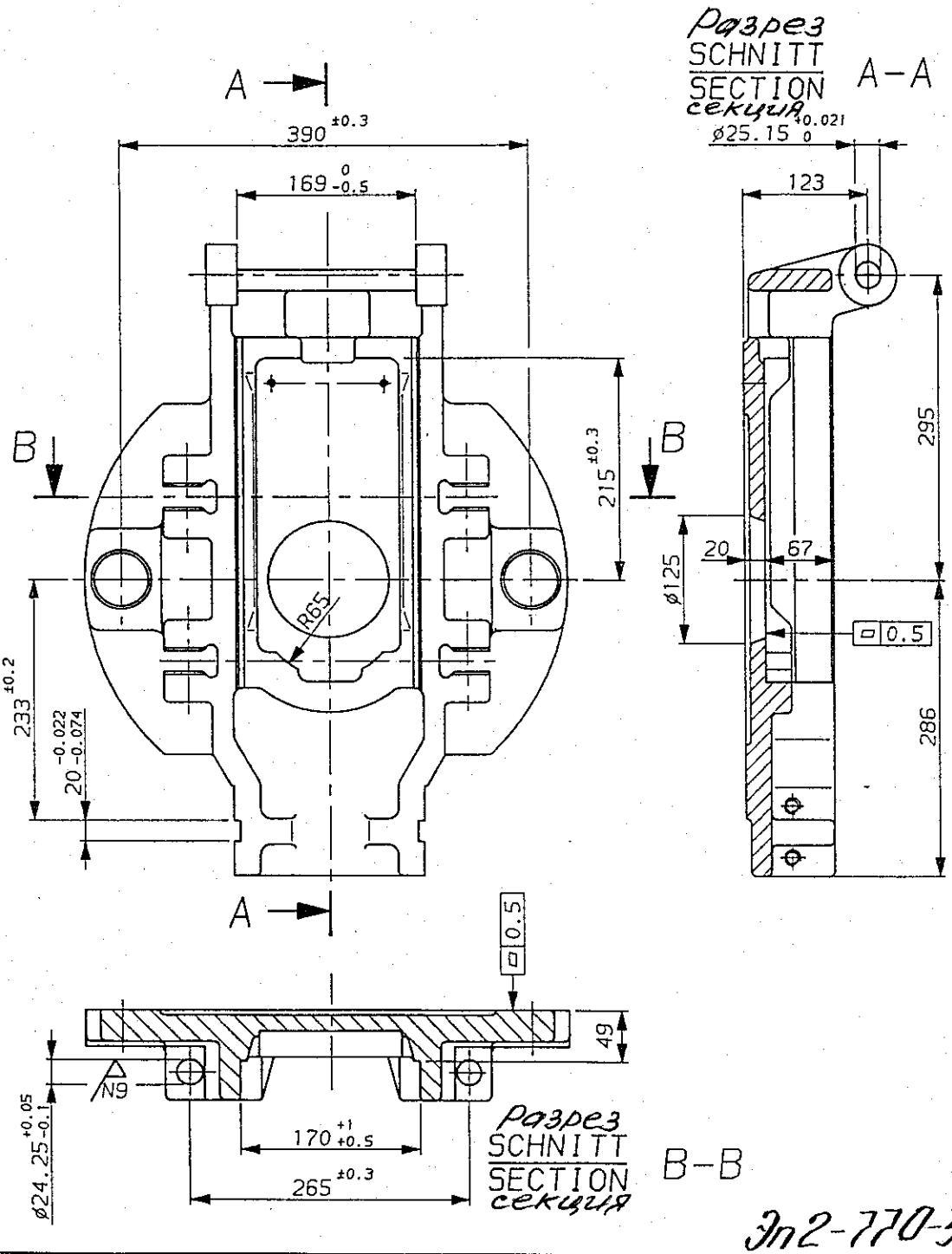
3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
1		013726 CARRIAGE FORK 13QC	V-13726.2 Вилка		1	pcs
2		014109 FORK 13QC	V-14109.2 Вилка		1	pcs
3		014110 RING 13QC	V-14110.3 Кольцо		1	pcs
4		102172 Набор шестигольных винтов HEXAGON SOCKET HEAD CAP SCREW M10X12 DIN 912-8.8			2	pcs
5		102427 Шапра GROOVED PIN, THIRD LENGHT CENTER GROOVED 8X35 DIN 1475-STEEL			1	pcs

Эл 2-770-35-33

End of list

Корпус
Housing 013439

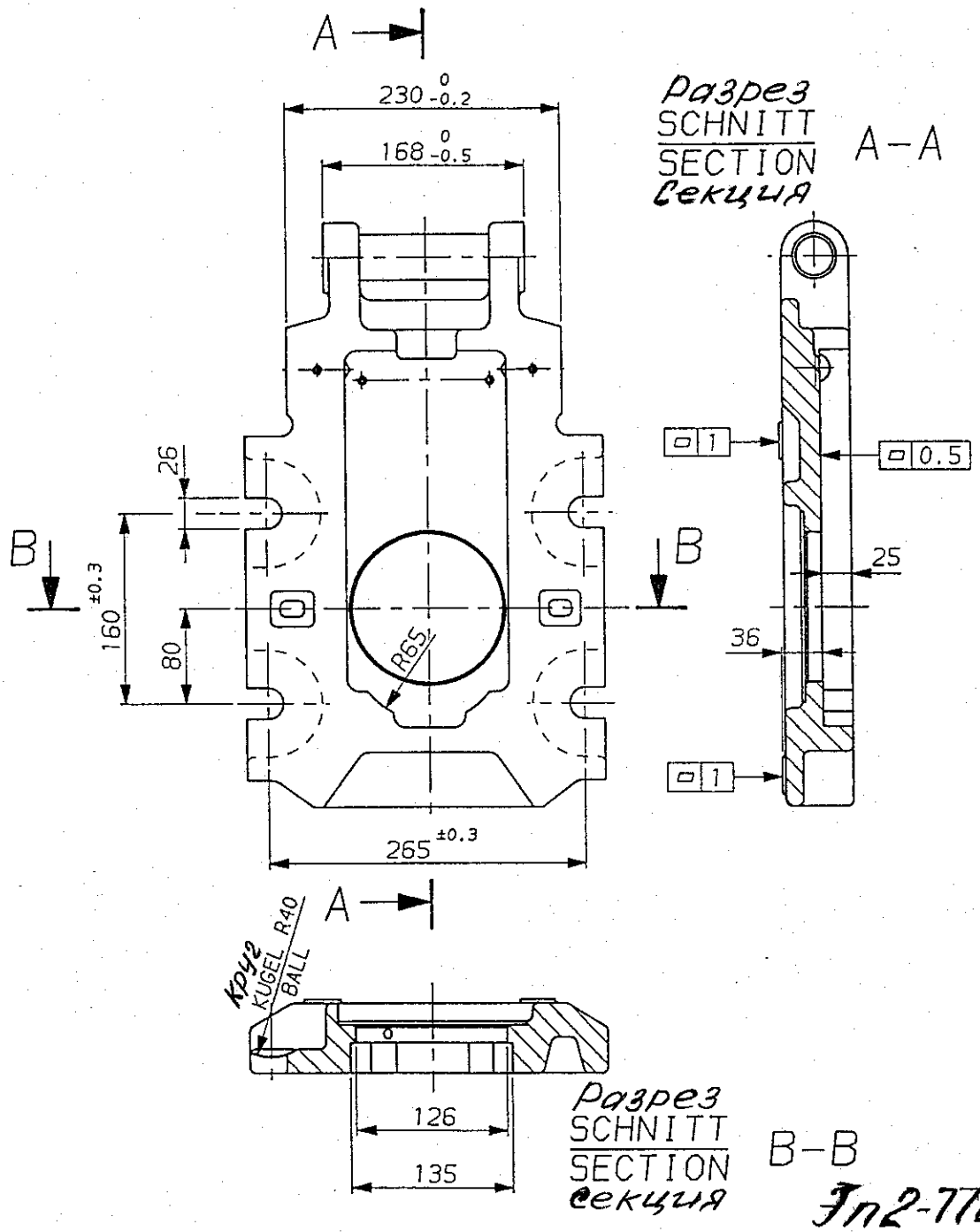


Эл2-770-35-34

PASSUNGSSYSTEM EINHEITSBOHRUNG H7										FITTING TOLERANCE. BORING STANDARD H7															
	DIN 7168	Genauigkeit bearbeiteter, untolerierter Masse bei Längen bis mm Out of tolerance accuracy for lengths in mm to													Radien bis R mm Radii to R mm					Winkel Angels					
	mittel middle	3	6	30	120	315	1000	2000	4000	6000	12000	16000	20000		3	6	30	120	315	L=	10	50	120	120
	± →	0.1	0.1	0.2	0.3	0.5	0.8	1.2	2	3	4	5	6		0.2	0.5	1	2	4		1°	30'	20'	10'

Корпус

Покрытие корпуса
Housing cover 013440



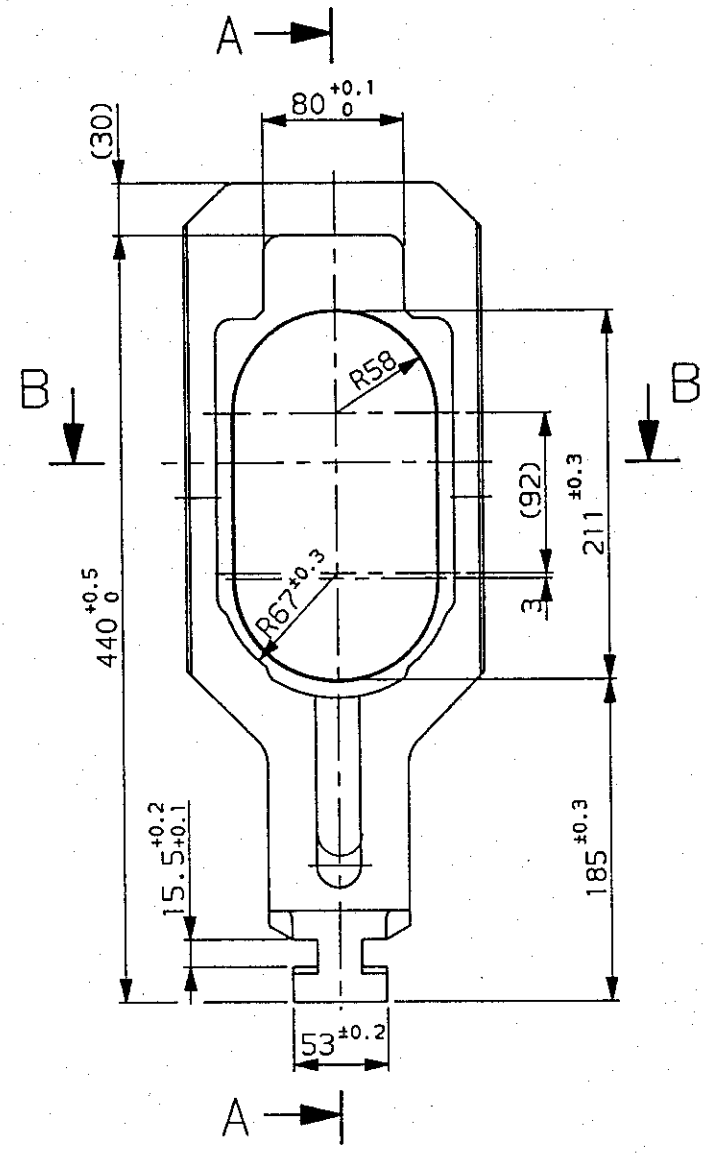
Тп2-770-35-35

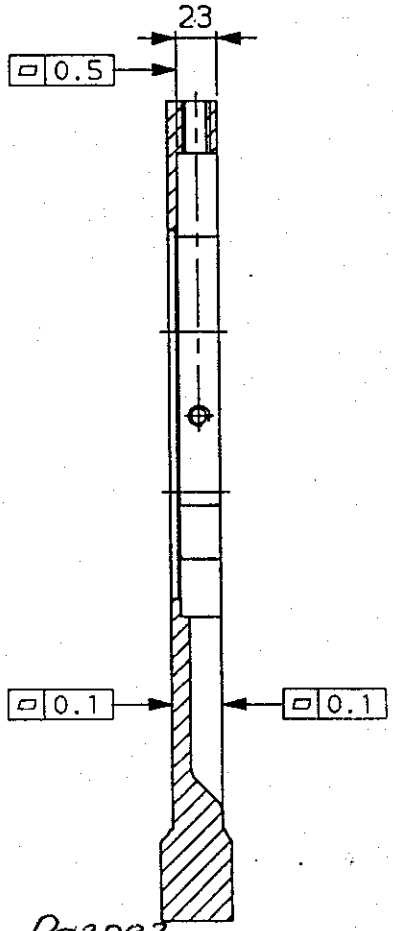
PASSUNGSSYSTEM EINHEITSBOHRUNG H7													FITTING TOLERANCE, BORING STANDARD H7										
DIN 7168	Genauigkeit bearbeiteter, untolerierter Masse bei Längen bis mm Out of tolerance accuracy for lengths in mm to												Radien bis R mm Radii to R mm					Winkel Angels				
mittel middle	3	6	30	120	315	1000	2000	4000	6000	12000	16000	20000	3	6	30	120	315	L=	10	50	120	120
± →	0.1	0.1	0.2	0.3	0.5	0.8	1.2	2	3	4	5	6	0.2	0.5	1	2	4		1°	30'	20'	10'

Крышка корпуса

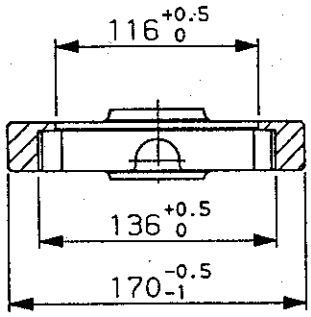
INTERSTOP® STOPINCAKTIENGESELLSCHAFT CH-6341 BAAR	Kontroll- / Reparaturzeichnungen Control / Repair Drawings	13 QC	
		Date: 05.95	Page:

Рама средней плиты
Mittelplattenrahmen / Middle plate frame
Teile Nr. / Part. No. 013441
Часть N





Разрез
SCHNITT
SECTION
Секция
A–A



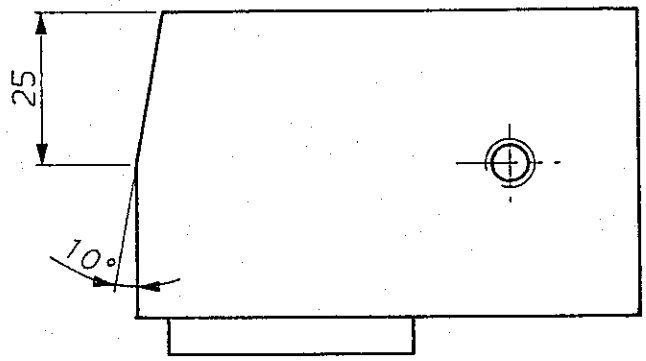
Разрез
SCHNITT
SECTION
Секция
B–B

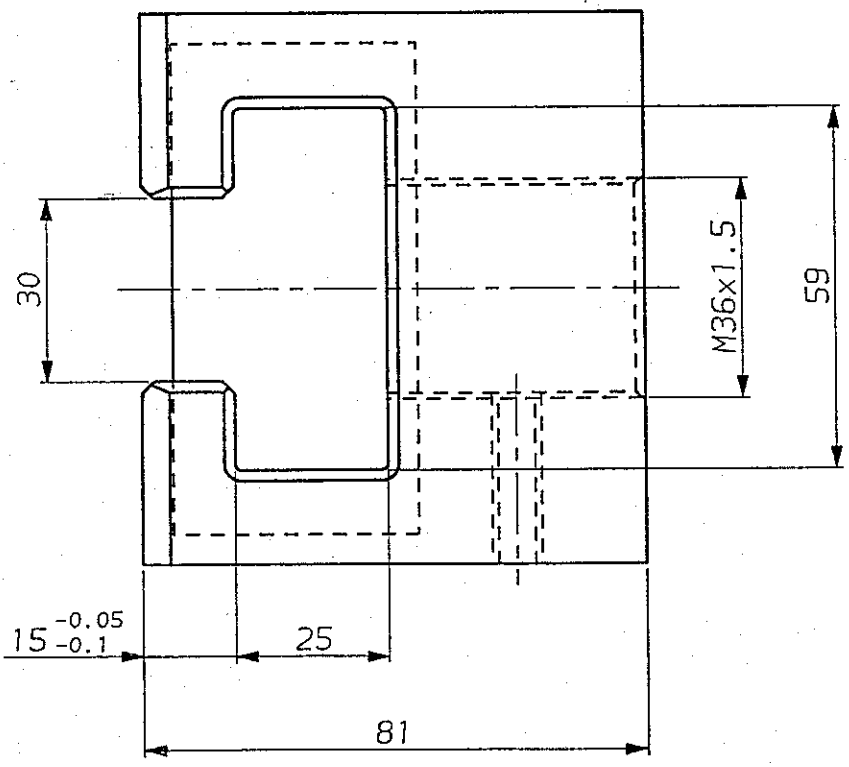
Эп2-770-35-36

PASSUNGSSYSTEM EINHEITSBOHRUNG H7													FITTING TOLERANCE: BORING STANDARD H7										
	DIN 7168 mittel middle	Genauigkeit bearbeiteter, untolerierter Masse bei Längen bis mm / Out of tolerance accuracy for Lengths in mm to												Radien bis R mm / Radii to R mm					Winkel Angels				
		3	6	30	120	315	1000	2000	4000	6000	12000	16000	20000	3	6	30	120	315	L=	10	50	120	120
	±	0.1	0.1	0.2	0.3	0.5	0.8	1.2	2	3	4	5	6	0.2	0.5	1	2	4		1°	30'	20'	10'

Рама средней плиты

Coupling claw 013329 Заостренный выступ





Хвостовик

PASSUNGSSYSTEM EINHEITSBOHRUNG H7													FITTING TOLERANCE, BORING STANDARD H7									
DIN 7168	Genauigkeit bearbeiteter, untolerierter Masse bei Längen bis mm Out of tolerance accuracy for lengths in mm to												Radien bis R mm Radii to R mm					Winkel Angels				
mittel middle	3	6	30	120	315	1000	2000	4000	6000	12000	16000	20000	3	6	30	120	315	L=	10	50	120	120
± →	0.1	0.1	0.2	0.3	0.5	0.8	1.2	2	3	4	5	6	0.2	0.5	1	2	4		1°	30'	20'	10'

Дп2-770-35-37

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 31 28 64, Telex 862 128 ist ch

INTERSTOP

Customer : Red October via Rokop
Project No.: 2014/419

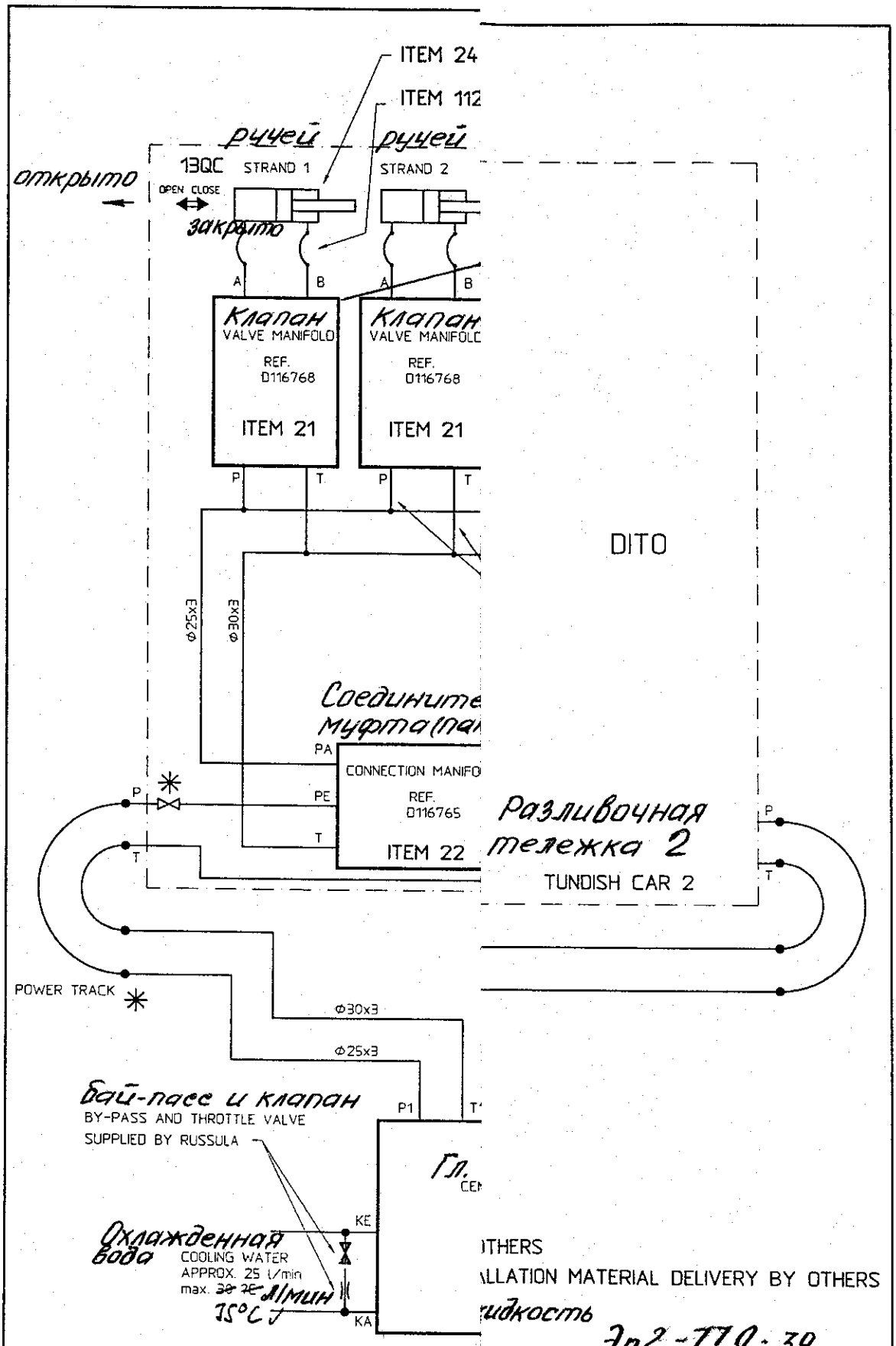
Гидравлическое оборудование

3. Hydraulic Equipment

3.1	General Hydraulic Flow Diagram	Схема гидравлическая принципиальная.
3.2	Functional Description	Функцион. описание.
3.3	Assembly Drawings and Parts List	Сборочные чертежи и перечни элементов
3.3.1	Central hydraulic power unit, Item 20	Центральный гидравлич. энергетический узел, прогр. 20.
3.3.2	Control unit (valve manifold), Item 21	Контрольный узел (клапан размножения), прогр. 21.
3.3.3	Connection manifold, Item 22	Размножение связи, прогр. 22.
3.3.4	Emergency accumulator, Item 120	Аварийный (критический) аккумулятор, прогр. 120.

Test Hydraulic Unit see chapter 6, Prep. Area

Эп 2-770-38



19. Mai 1995

(работы)
Описание функций гидравлической схемы

1 General

Общее

1.1 Drawing and part no. list
1.2 General layout (see dwg. no. B116759)
1.3 General technical data of the hydraulic drive
1.4 General hydraulic flow diagram (see dwg. no. B116763)

2 Functional Description of the Entire Electro-Hydraulic Drives

2.1 Description of the functional layout
2.2 Function, Operational phase I
2.3 Function, Operational phase II
2.4 Starting of the pumps
- **2.4.1** Starting by-pass pump 3
- **2.4.2** Starting main pump 1 or 2
- **2.4.3** Pump motor overload protection

2.5 Internal system pressure control (pressurizing the circuit)
2.6 External system pressure control
- **2.6.1** Starting or adding the main pump
- **2.6.2** Automatic start of the Stand-by pump
- **2.6.3** Automatic start and Switch over to the stand-by pump
- **2.6.4** Complete system pressure loss (emergency shut)
- **2.6.5** Booster accumulator pressure discharge

2.7 Hydraulic fluid level control
2.8 Hydraulic fluid temperature control
2.9 Cooling circuit
2.10 Filtration of the entire hydraulic system
- **2.10.1** Filter clogging control
- **2.10.2** Pressure peak suppression of the filter clogging indication.

2.11 Filling/filtering and pumping out of the hydraulic fluid

2.12 The hydraulic emergency system

2.13 The connection manifold

2.14 The valve manifold

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стр 1. - всего 37 стр

Описание функций гидравлики

Сварка и часть N...

1.1 Drawing and Part No. List

Item No.	Drawing No. Part No. Ч. N	Описание Description	
	B116759	General Layout	
	B116856	General hydraulic flow diagram	
20	B116762	Central hydraulic power unit A02,	Assembly Dwg.
	B116763		Hydraulic flow diagram
	105680		Parts list
22	B116764	Connection manifold,	Assembly.Dwg.
	D116765		Hydraulic flow diagram
	104285		Parts list
21	B116767	Valve manifold	Assembly Dwg.
	D116768		Hydraulic flow diagram
	109830		Parts list
120	D116770	Emergency accumulator	Assembly Dwg.
	112713		Parts list

Эл2-770-40
стр2

Описание функций гидравлики

Общие тех. данные по гидравлике

1.3 General Technical Data of the Hydraulic drive

Общее

General

Год создания

Year of construction	:	1995 N и тип разливочн. уст-ва
Number and type of tundish gates	:	6 x 13 QC (per car)
Number and type of ladle gates	:	N и тип
Electric main power supply	:	3 x 380V / 50 Cycles
Control & solenoid tension	:	24 VDC
Max. main power consumption	:	max. 26 kW, normal op. 15 kW
Max. cooling water requirements	:	20-25 l/min at approx. 35°C
Hydraulic fluid	:	Quintolubric 822-300 (to be used by customer)
Seals quality	:	Viton
Fitration requirements	:	10 microns abs.

Central hydraulic power unit (item no. 20):

Number and typ of units	:	1 x A02-5
Unit no.	:	H-5385
Motor power (Main pump 1/2)	:	11 kW
Motor power (By-pass pump 3)	:	1,5 kW
Pump capacity (Main pump 1/2)	:	30,55 l/min at 1500 rev/min
Pump capacity (By-pass pump 3)	:	aprox. 40 l/min at 1500 rev/min
Max. system pressure	:	200 bar (2900 p.s.i.)
Normal working pressure	:	90-135 bar (1305-1960 ps.i.)
Size of booster accumulator	:	Nom. 24 l

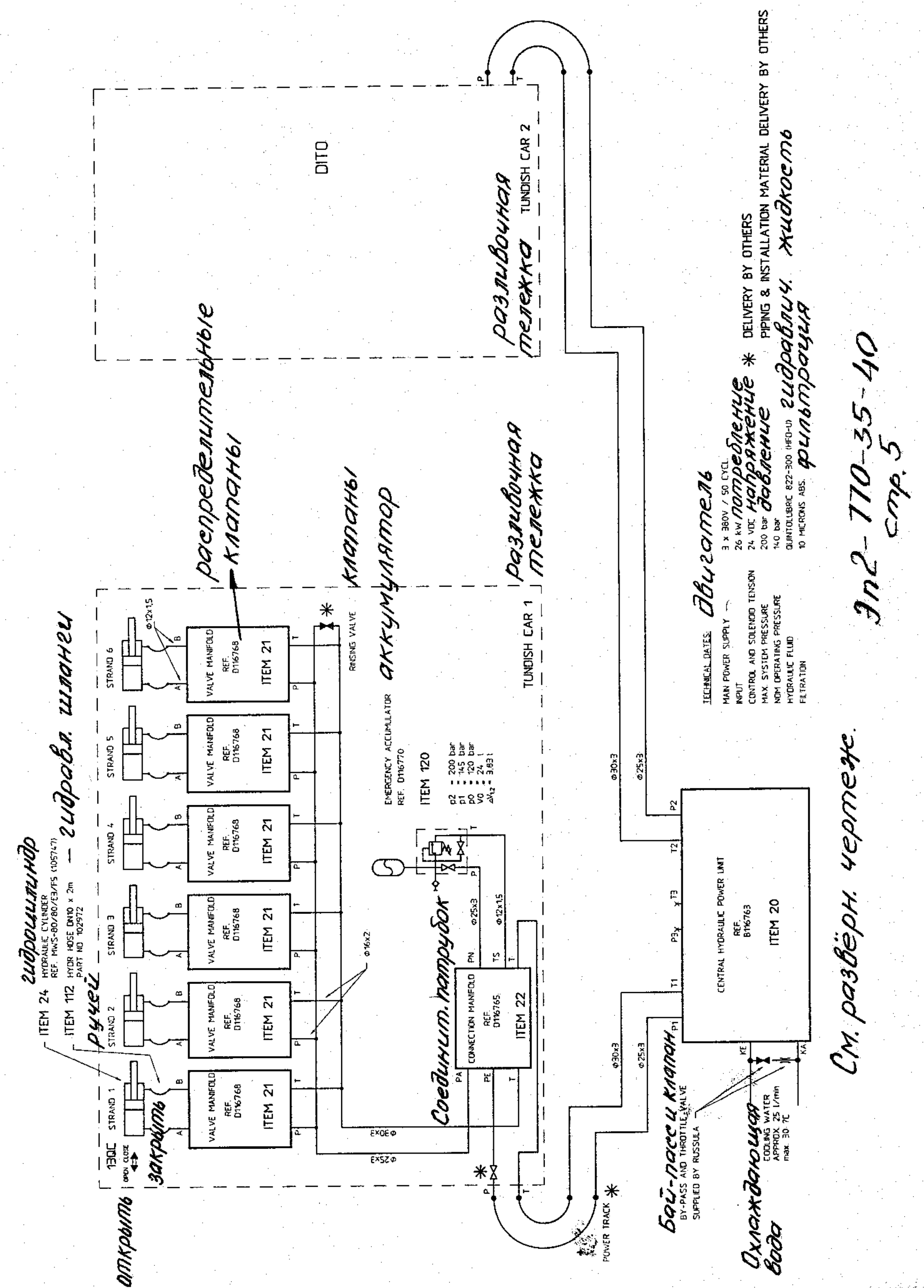
Hydraulic accessory parts:

Connection manifold	:	2 x VTB 100 (Item no. 22)
Valve manifold	:	12 x TS/S2 (Item no. 21)
Emergency accumulator	:	2 x 24 l (Item no. 120)
Hydraulic cylinder (Thundish gate)	:	12 x MWS 80-80 (item no.24)

эл2.770.35-40
стр 4

Описание гидравлических функций

INTERSTOP® STOPINC AKTIENGESELLSCHAFT CH-6341 BAAR	3.3 Functional Description of Hydraulics	Customer: ROKOP Project No.: 2014 / 419 *стр.*
		Date: 11.05.95 | Page: 5/37

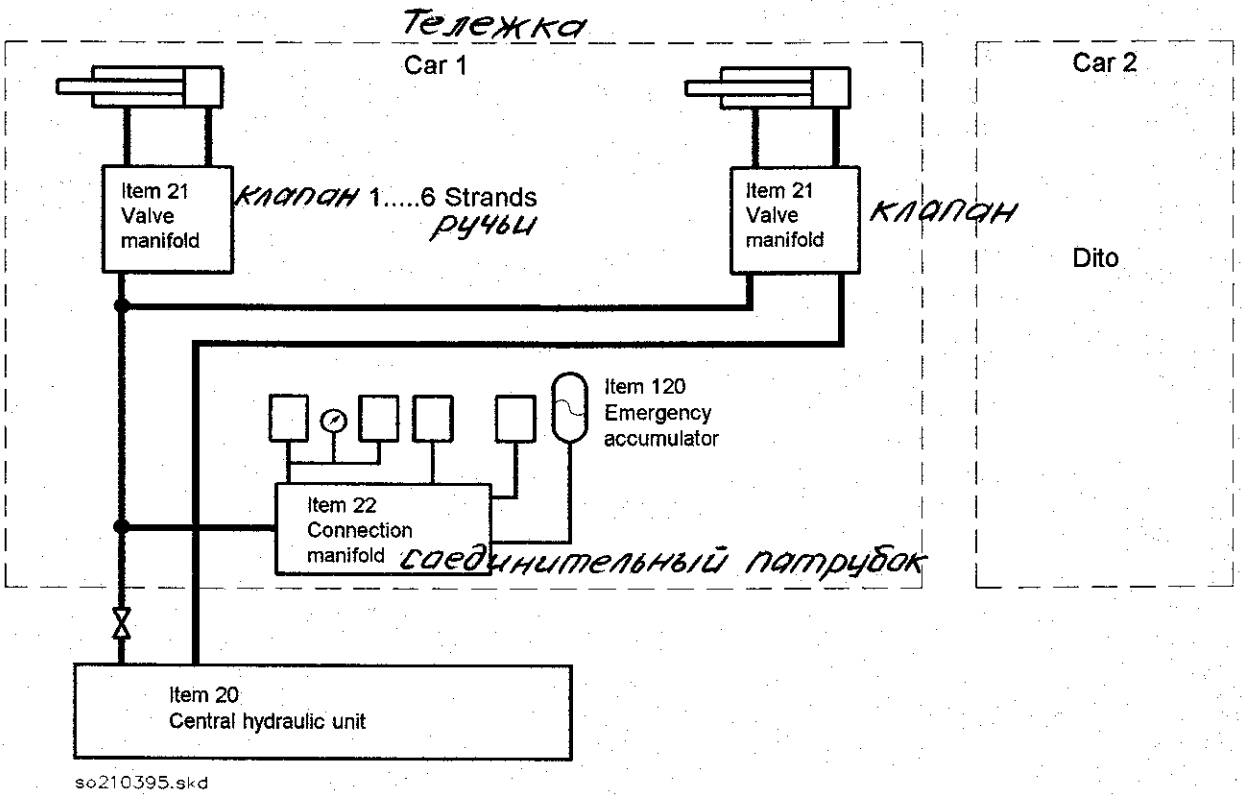


Гидравлика

2. Functional Description of the Entire Electro Hydraulic Drives (for Tundish Gate Control)

2.1 Description of the functional layout

The flow chart below shows generally the arrangement as well as the functional layout of the hydraulic drive system:



The carrier for hydraulic controls is connected to and powered by the central hydraulic power unit, item no. 20.

For operational and service reasons the power unit will be placed somewhere remote on the teeming platform or on a lower level.The carrier is fed by a pressure and return line. Further a fully independant emergency pressure system which is battery powered, can be activated to shut the gates in case of an emergency. This system does consist of the emergency accumulator, item no. 120, the connection manifolds item no. 22 and the valve manifolds item no. 21. During normal operation the tundish gates will be controlled from their specific valve manifolds, item no.21.

For service reasons all pressure lines can be locked-off separately on the central hydraulic power unit, item no. 20.

Эл2-770-35-40
стр.6

The power unit item no. 20 has to fulfil the following specifications:

- To guarantee a constant and stable pressure supply. To overcome peak situations, i.e. short unusual flow quantities.

- To guarantee a perfect functioning fluid temperature control and filtration, by means of an additional filtration and cooling circuit.

- To achieve best possible results on automatic control, the valve manifolds item no. 21 should be situated as near as possible to their gates.

All items which are part of the emergency system shall be arranged in a well protected area to remain operational in case of unusual conditions, i.e. excess radiation, steel splashes etc.

For easy system checks or maintenance, manifolds are equipped with measuring ports or permanent reading gauges.

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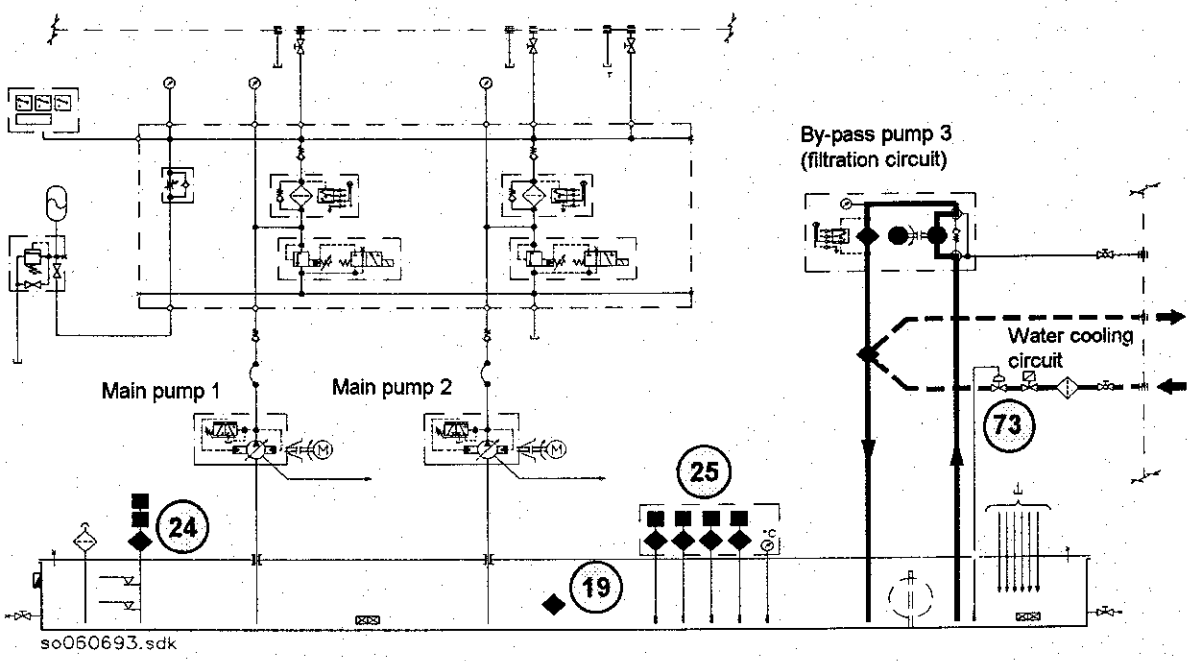
2.2 Functions, Operational Phase I

The functions of "**Operational Phase I**" regarding the hydraulics can be summarized as follows:

The actual preheat or casting process is interrupted. To keep the hydraulic drive ready, certain auxiliary systems have to remain active, especially those which maintain the correct pressure fluid condition.



Hydraulic flow diagram of the Central Hydraulic Power Unit (Activated items)

Legend:
- 19 Heater rod
- 24 Oil level control (Float switch)
- 25 Oil temperature control (4 Thermostats)
- 73 Control valve -- temparature controlled

-- All electrical controls are operational

-- The by-pass pump 3 system (filtration circuit) hauls permanently, to ensure the system's internal fluid conditioning (temperature surveillance and filtration).

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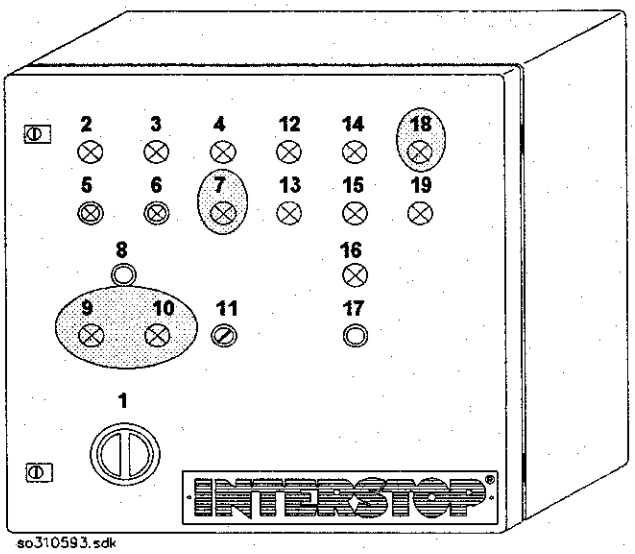
cmp 8

Either the heating rod (19) or the cooling water flow is alternatively switched on, controlled by the temperature sensor (25).

The main pumps 1 or 2 are normally switched off during **"Operational Phase I"**, so that the pressure supply to the valve manifolds (item no.21) is interrupted.



Control panel situated on the
Central hydraulic power unit

1	Main switch	
2	Pump 1 failure	Alarm lamp red
3	Pump 2 failure	Alarm lamp red
4	Pump 3 failure	Alarm lamp red
5	Pump 1 On	Iluminated push-button green
6	Pump 2 On	Iluminated push-button green
7	Pump 3 On	Indicating lamp green
8	Pump 1&2 Off	Push-button red
9	Heating On	Indicating lamp green
10	Cooling On	Indicating lamp green
11	Service key pump 3	Key-switch
12	Oil level low	Alarm lamp red
13	Oil level too low	Alarm lamp red
14	Oil temp. too high	Alarm lamp red
15	Oil temp. high	Alarm lamp red
16	Oil temp. low	Alarm lamp red
17	Lamp control	Push-button yellow
18	Pressure low	Alarm lamp red
19	Filter alarm	Alarm lamp red

-- Main switch (1) in "ON" position

-- Indicating lamp "PUMP 3 ON" (7) lights solid

-- Main pumps 1 or 2 in "OFF" position

-- Service key (11) switch pump 3 in working position

-- Alarm lamp (18) "PRESSURE LOW" lights solid

-- Indicating lamp (9 or 10) "HEATING ON" or "COOLING ON" lights solid

-- The process controller part, for the control of the hydraulic system is activated

The hydraulic system control during "**Operational Phase I**" is subject to the following basic functions:

Basically the "**Operational Phase I**" has to guarantee a permanent readiness of the hydraulic circuit (i.e. fluid viscosity) for a safe start-up and automatic casting.

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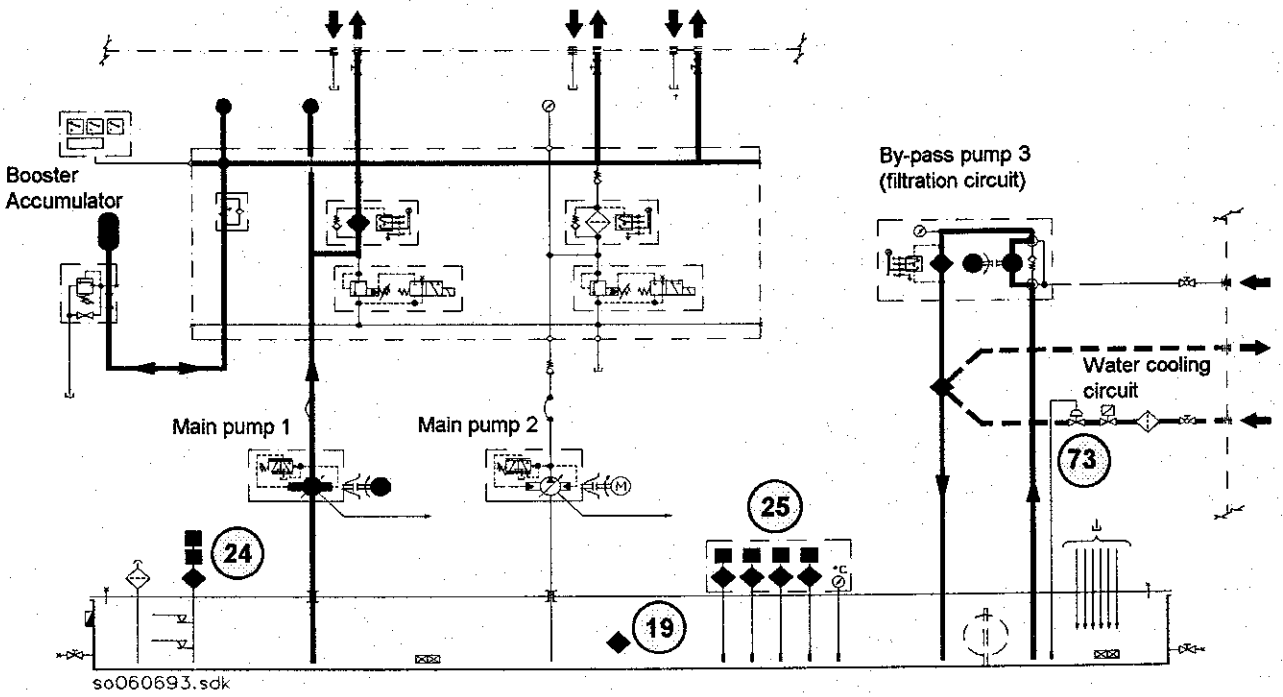
OPERATIONAL SITUATION	CONSEQUENCE FUNCTION
No fluid in reservoir	Pump 3 can be switched "ON" Pumps 1/2 and Heater are interlocked "OIL LEVEL TOO LOW" alarm (13)
Fluid level in reservoir "TOO LOW"	Main pumps 1 or 2 cannot be started Heater is interrupted automatically "OIL LEVEL TOO LOW" alarm (13)
Fluid level in reservoir "LOW"	Main pumps 1 or 2 can be started "OIL LEVEL LOW" alarm (12)
Fluid temperature in reservoir < 20°C	Main pumps 1 or 2 cannot be started Heater "ON" ; Cooling circuit "OFF" "OIL TEMPERATURE LOW" alarm (16)
Fluid temperature in reservoir > 35°C	Main pumps 1 or 2 can be started Heater "OFF" ; Cooling circuit "ON"
Fluid temperature in reservoir > 60°C	Main pumps 1 or 2 can be started Heater "OFF" ; Cooling circuit "ON" "OIL TEMP. HIGH" alarm (15)
Fluid temperature in reservoir > 70°C	Main pumps 1 or 2 cannot be started Heater "OFF" ; Cooling circuit "ON" "OIL TEMPERATURE TOO HIGH" alarm (14)
Pump 3 is not operational	Pump 3 can be switched "ON" Pumps 1 and 2 are interlocked Heater is interlocked

2.3 Functions, Operational Phase II

The functions of the "**Operational Phase II**" of the hydraulic drive can be summarized as follows:

- The system is entirely ready for use. All units are operational. Pressure supply to the tundish cars and where applicable to the ladle controls is provided.
- The emergency system is ready.
- None of the alarm or failure indicating lamps are on.



Hydraulic flow diagram of the Central Hydraulic Power Unit

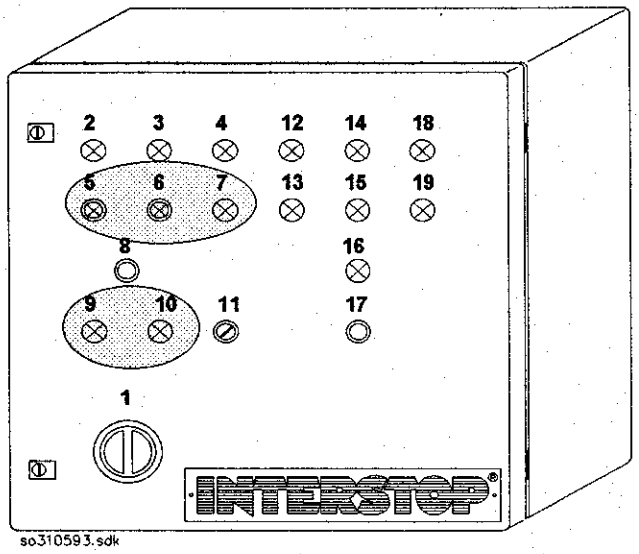
Legend:
19 Heater rod
24 Oil level control (Float switch)
25 Oil temperature control (4 Thermostats)
73 Control valve - temperature controlled

One of the main pumps 1 or 2 is operational, as well as the fluid conditioning circuit pump 3. All sensors, level- and temperature switches are activated to run the system within the specified operational parameters.

Jn2-770-35-40 cmp 11

Either the heating rod (19) or the cooling water flow is alternatively switched on, controlled by the temparature sensor (25).

The main pumps 1 or 2 and pump 3 are operational.



Control panel situaded on the
Central hydraulic power unit

1	Main switch	
2	Pump 1 failure	Alarm lamp red
3	Pump 2 failure	Alarm lamp red
4	Pump 3 failure	Alarm lamp red
5	Pump 1 On	Illuminated push-button green
6	Pump 2 On	Illuminated push-button green
7	Pump 3 On	Indicating lamp green
8	Pump 1&2 Off	Push-button red
9	Heating On	Indicating lamp green
10	Cooling On	Indicating lamp green
11	Service key pump 3	Key-switch
12	Oil level low	Alarm lamp red
13	Oil level too low	Alarm lamp red
14	Oil temp. too high	Alarm lamp red
15	Oil temp. high	Alarm lamp red
16	Oil temp. low	Alarm lamp red
17	Lamp control	Push-button yellow
18	Pressure low	Alarm lamp red
19	Filter alarm	Alarm lamp red

- Main switch (1) in "ON" position
- Indicating lamp "PUMP 3 ON" (7) lights solid
- Main pumps 1 or 2 switched "ON" by illuminated push-button (5 or 6))
- Service key (11) switch pump 3 in working position
- Indicating lamp (9 or 10) "HEATING ON" or "COOLING ON" lights solid
- All alarm lamps should be off
- The process controller part, for the control of the hydraulic system is activated

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The hydraulic system control during "**Operational Phase II**" is subject to the following basic functions:

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OPERATIONAL SITUATION	CONSEQUENCE FUNCTION
Fluid level in reservoir "TOO LOW"	Pump 3 can be started Pumps 1 or 2 cannot be started Operational pump 1 or 2 will be switched-off automatically Heater is interrupted automatically All tundish gates will be shut automatically "OIL LEVEL TOO LOW" alarm (13)
Fluid level in reservoir "LOW"	Pumps 1 or 2 can be started Pump 1 or 2 remain operational "OIL LEVEL LOW" alarm (12)
Fluid temperature in reservoir < 20°C	Pump 3 can be started Pumps 1 or 2 cannot be started but remain on when operational Heater "ON" ; Cooling circuit "OFF" "OIL TEMPERATURE LOW" alarm (16)
Fluid temperature in reservoir > 35°C	All pumps can be started Heater "OFF" ; Cooling circuit "ON"
Fluid temperature in reservoir > 60°C	All pumps can be started Heater "OFF" ; Cooling circuit "ON" "OIL TEMP. HIGH" alarm (15)
Fluid temperature in reservoir > 70°C	Pump 3 can be started Pumps 1 or 2 cannot be started Operational pump 1 or 2 will be switched-off automatically Heater "CFF" ; Cooling circuit "ON" All tundish gates will be shut automatically "OIL TEMPERATURE TOO HIGH" alarm (14)
System pressure < 135-140 bar	Pump 3 remains operational Pump 1 or 2 stops automatically All tundish gates will be shut automatically
System pressure > 160 bar	Second main pump will be switched "ON" automatically (see Chapter 3.3.x.y) "PRESSURE LOW" alarm (18)
System pressure < 180 bar	Everything is ok. No alarm occours

3n2-770-35-40 cmp 13

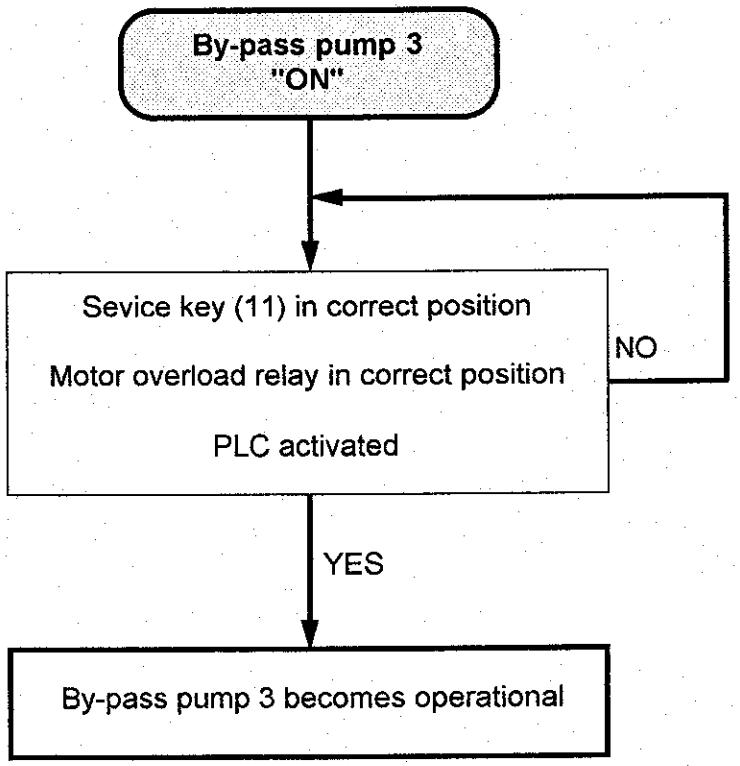
2.4 Starting of the Pumps

2.4.1 Starting By-pass Pump 3

-- The PLC-controls to operate the hydraulics are switched "ON"

-- The main switch (1) on the central hydraulic power unit (item no.20) is in "ON" position

-- The By-pass pump 3 can be started as shown on the following chart:



By-pass pump 3 becomes operational as soon as all the above conditions are fulfiled !

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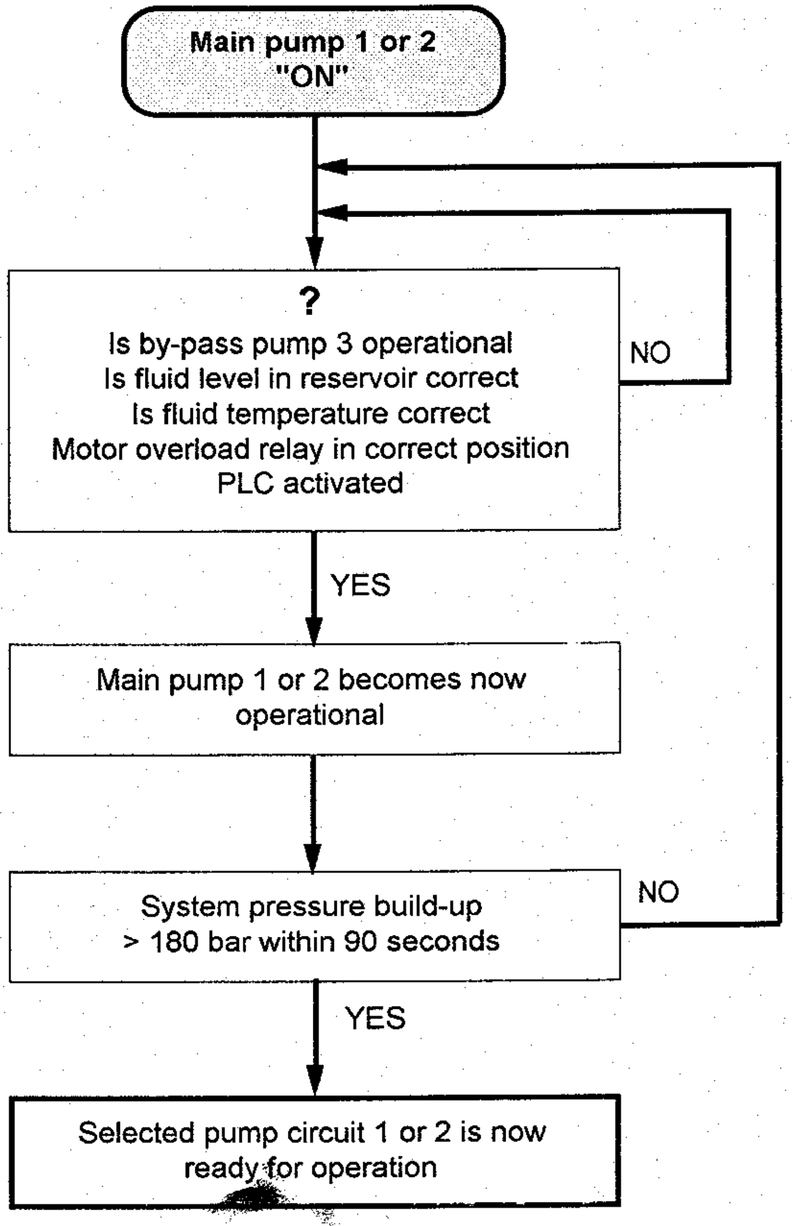
cmp14

2.4.2 Starting Main Pumps 1 or 2

- -- The PLC-controls to operate the hydraulics are switched "ON"
- -- The main switch (1) on the central hydraulic power unit (item no.20) is in "ON" position
- -- The By-pass pump 3 is operational
- -- Main pump 1 or 2 can be started as shown on the following chart:



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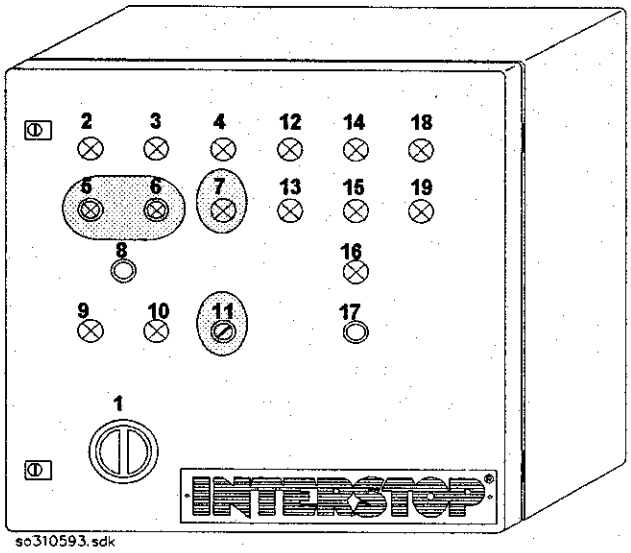
cmp 15

The main pumps 1 or 2 and by-pass pump 3 can by switched "ON":

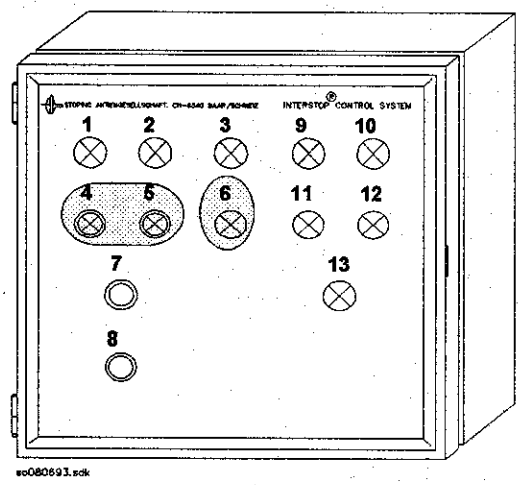
On the control panel situated directly on the central hydraulic power unit (item no. 20)



so310593.sdk

1	Main switch	
2	Pump 1 failure	Alarm lamp red
3	Pump 2 failure	Alarm lamp red
4	Pump 3 failure	Alarm lamp red
5	Pump 1 On	Iluminated push-button green
6	Pump 2 On	Iluminated push-button green
7	Pump 3 On	Indicating lamp green
8	Pump 1&2 Off	Push-button red
9	Heating On	Indicating lamp green
10	Cooling On	Indicating lamp green
11	Service key pump 3	Key-switch
12	Oil level low	Alarm lamp red
13	Oil level too low	Alarm lamp red
14	Oil temp. too high	Alarm lamp red
15	Oil temp. high	Alarm lamp red
16	Oil temp. low	Alarm lamp red
17	Lamp control	Push-button yellow
18	Pressure low	Alarm lamp red
19	Filter alarm	Alarm lamp red

On the operator station central hydraulic power unit (item no. 4) situated on the operating platform or in the control room.



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1	Pump 1 failure	Alarm lamp red
2	Pump 2 failure	Alarm lamp red
3	Pump 3 failure	Alarm lamp red
4	Pump 1 On	Iluminated push-button green
5	Pump 2 On	Iluminated push-button green
6	Pump 3 On	Indicating lamp green
7	Pump 1&2 Off	Push-button red
8	Lamp control	Push-button yellow
9	System pressure low	Alarm lamp red
10	Emerg. pressure low	Alarm lamp red
11	Oil temperatur high	Alarm lamp red
12	Oil level low	Alarm lamp red
13	Filters	Alarm lamp red

Jn2-770-35-40
cmp 16

2.4.3 Pump Motor Overload Protection

All 3 pump motors are protected against overload by means of overload relais. Needs a motor too much electrical power to run the pump, the overload relais stops the pump automatically.

012E0003.TBL

OPERATIONAL SITUATION	CONSEQUENCE FUNCTION
Overload pump 1	Alarm lamps "PUMP 1 FAILURE" lights solid: on control panel central hydraulic power unit (item no. 20) on operator station central hydraulic power unit (item no. 4) Alarm lamp "ALARM" on all operator stations tundish gate (item no. 3) lights solid and on op. station ladle gate (81) if applicable PUMP 2 STARTS AUTOMATICALLY
Overload pump 2	Alarm lamps "PUMP 2 FAILURE" lights solid: on control panel central hydraulic power unit (item no. 20) on operator station central hydraulic power unit (item no. 4) Alarm lamp "ALARM" on all operator stations tundish gate (item no. 3) lights solid and on op. station ladle gate (81) if applicable PUMP 1 STARTS AUTOMATICALLY
Overload pump 3	Alarm lamps "PUMP 3 FAILURE" lights solid: on control panel central hydraulic power unit (item no. 20) on operator station central hydraulic power unit (item no. 4) Alarm lamp "ALARM" on all operator stations tundish gate and ladle gate if applicable (item no.3/81) lights solid

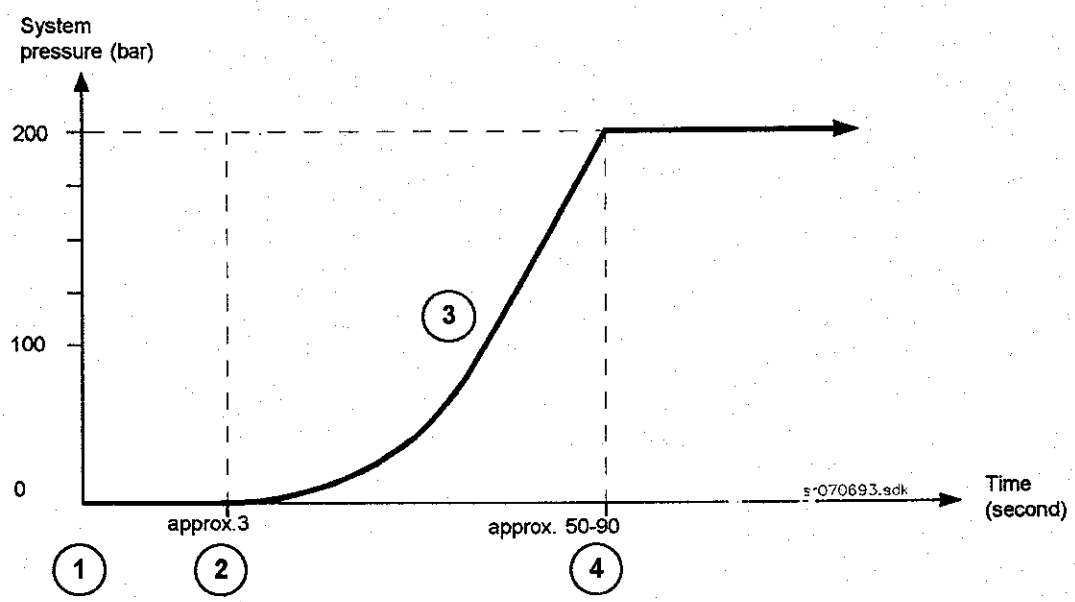
Important

Should an overload occurs on both main pumps 1&2, a flashing alarm on all operator stations will be announced and all tundish gates of the car in casting position and the ladle gate will be shut automatically as soon as the working pressure drops to the bottom operating level.

Jn2-770-35-40

2.5 Internal System Pressure control (Pressurizing the circuit)

The system pressure build-up, after putting one of the main pumps into operation, is maintained as shown on the following chart:

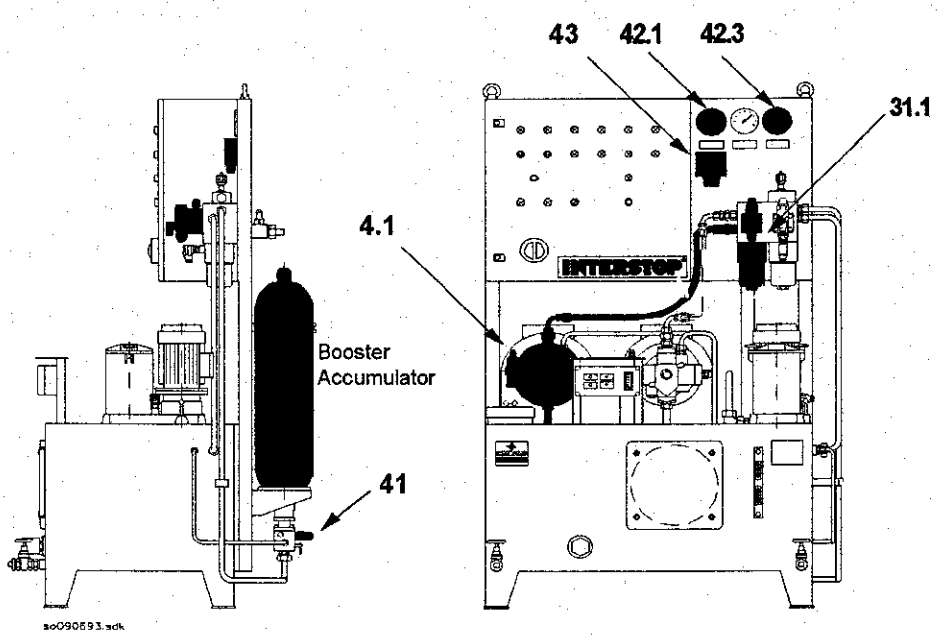


012E0003.TBL

OPERATIONAL SITUATION	CONSEQUENCE FUNCTION
Step 1 Start main pump	"START" of main pump is init'ated. The motor is starting in delta mode.
Step 2 Pressure-less circuit shuts	After approx. 3 seconds (adjustable on PLC) the solenoid of pressure control valve (31) gets out of circuit to initiate the system pressure build-up.
Step 3 Pressure circuit build-up	The entire pressure circuit (booster accumulator, emergency accumulator and pipelines) will now be charged.
Step 4 Ready system pressure	As soon the pressure of the system has reached the 200 bar limit, the pump throttles automatically back to minimum haulage.
Now the hydraulic system is ready !	

Jn2-770-35-40 cmp 18

Picture shows the entirely initiated pressure circuit of main pump 1
(The same explanations do apply for cicuit 2)



The sytem internal pressure control of the pressure circuit consist of the following adjustable items:

4.1	Pressure control valve on the main pump	Setting value = 200 bar (2900 p.s.i.)
31.1	Pressure control valve in the P-line	Setting value = 230 bar (3335 p.s.i.)
41	Booster accumulator safety valve (**do not touch !!**)	Setting value = 330bar ((4785 p.s.i.)

Further reading possibilities of the system pressure are as follow:

42.1 Pressure gauge for main pump 1

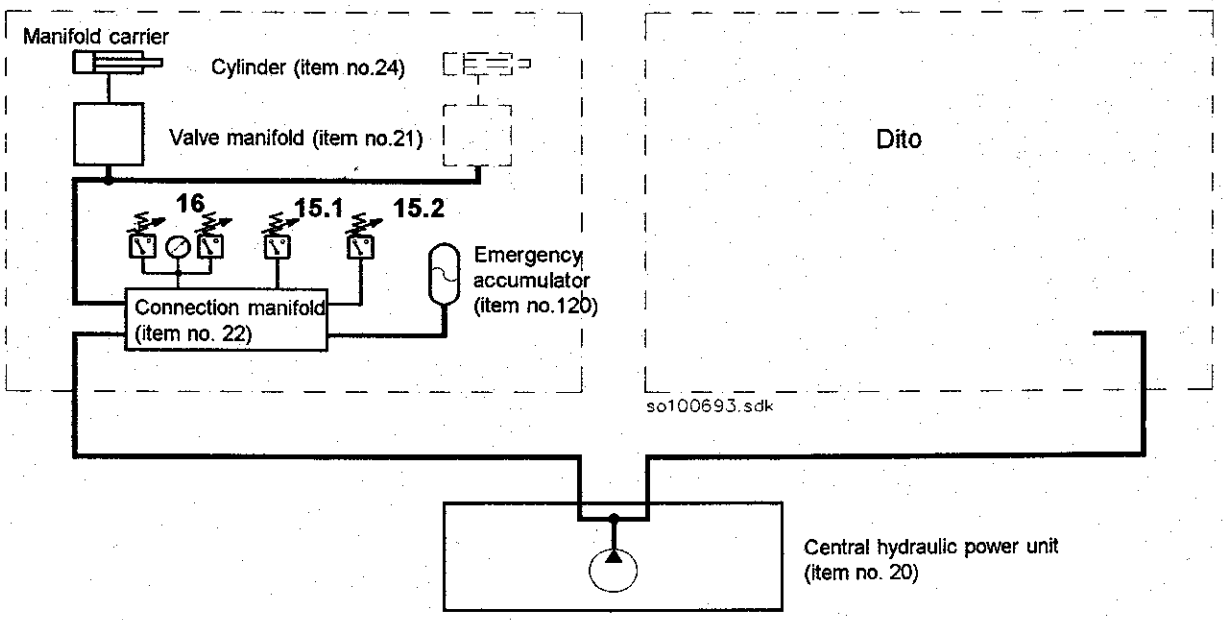
42.3 Pressure gauge for booster accumulator

43 Electronic pressure switch (if existing on unit or external circuit)

In 2-770-35-40
Empl9

2.6 External System Pressure control

The external system pressure control will be established on the manifold carrier.
Pressure switches are situated on the connection manifold (item no. 22).
See also chapter "Connection Manifold 3.3)

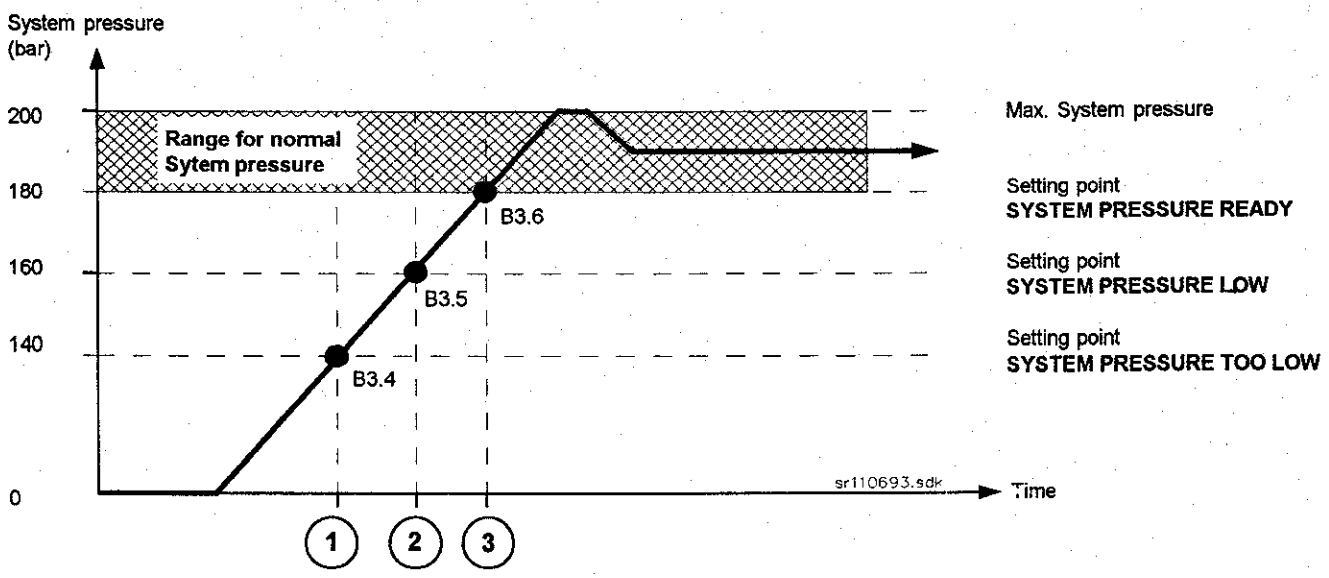


The pressure switches (15.1/15.2/16) installed have the following control functions:

012E0004.TBL

Type of Pressure Switch	Status & El. switch	CONSEQUENCE FUNCTION
Double pressure switch (16) Operating pressure control	"System pressure ready" setting point Electrical switch B3.6 over 180 bar	System ready for operation
	"System pressure low" setting point Electrical switch B3.5 below 160 bar	Unusual pressure loss. Stand-by main pump will be started with an adjustable time delay (0-10 sec.). Actual setting = 0,5 sec.
Single pressure switch (15.1) Low pressure handling	"System pressure too low" setting point Electrical switch B3.4 below 140 bar	Abnormal pressure loss. Alarm situation. All tundish gates will be shut automatically by the independant powered emerg. system. Main pump 1 or 2 will be switched off automatically.
Single pressure switch (15.2) Emergency accumulator pressure	"Emergency accumulator pressure" setting point Electrical switch B3.3 below 180 bar	Control switch for emergency accumulator pressure. An alarm will be activated on the operator station (item no.4) as soon the accumulator pressure decreases below 180 bar.

2.6.1 Starting or Adding the Main Pump



IMPORTANT !

When starting or adding one of the main pumps, the pressure switch functions "SYSTEM PRESSURE LOW" (B3.5) and "SYSTEM PRESSURE TOO LOW" (B3.4) are inactive in order to prevent a permanent change over of the main pumps or a false emergency shut. As soon as the working pressure 180 bar (B3.6) has been established the original pressure switch functions (see chapter ....) will be activated automatically.

Furthermore, in the case where the system pressure cannot be reached within 90 seconds after starting one of the main pumps, the PLC is programmed to switch off the running pump automatically. This prevents to empty the fluid reservoir in case of a "System leackage".

The adding of the stand-by main pump is only to overcome a sudden system pressure drop, which under normal conditions should not occur. **Both main pumps should never be operational for longer periods !**

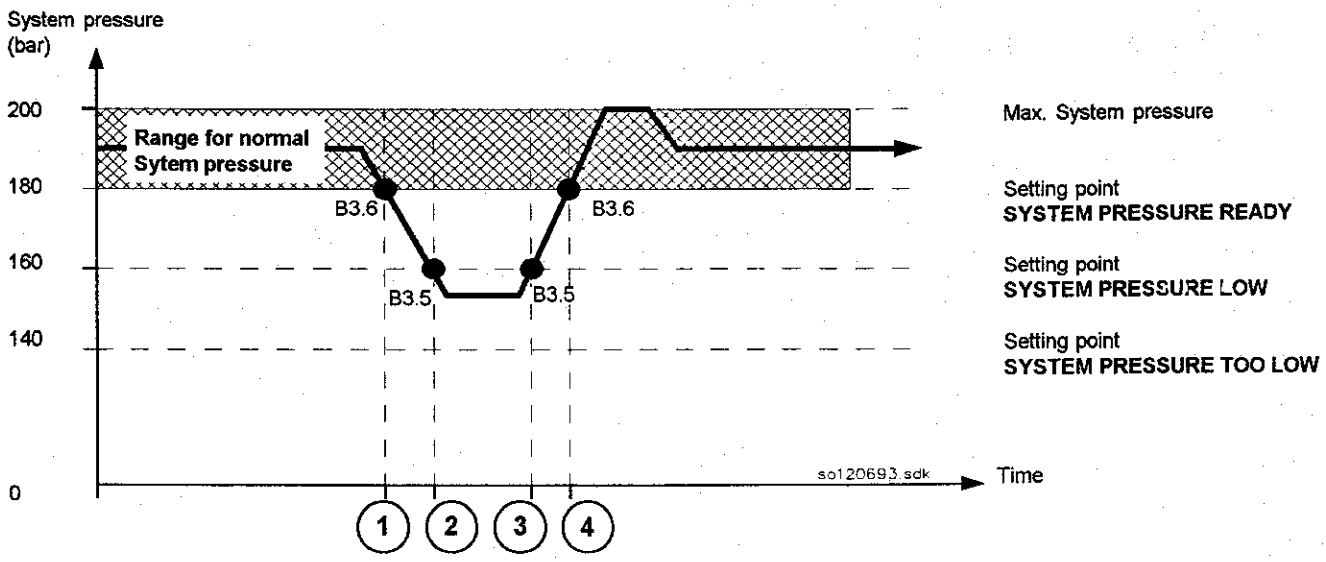
012E0006.TBL

OPERATIONAL SITUATION	CONSEQUENCE FUNCTION
Step 1 Setting point (B3.4) SYSTEM PRESSURE TOO LOW	Pressure switch inactive during pressure build-up "SYSTEM PRESSURE LOW" alarm lamp lights solid "EMERGENCY PRESSURE LOW" alarm lamp ligths solid
Step 2 Setting point (B3.5) SYSTEM PRESSURE LOW	Pressure switch inactive during pressure build-up "SYSTEM PRESSURE LOW" alarm lamp lights solid "EMERGENCY PRESSURE LOW" alarm lamp lights solid
Step 3 Setting point (B3.6) SYSTEM PRESSURE READY	The system pressure circuit gets ready All alarm lamps should be off "READY" lamp [illegible] solid

3n2-220-35-40-cmp21

2.6.2 Automatically Start of the Stand-by Pump

The following chart shows the automatic adding of the stand-by main pump in case of sudden pressure loss, activated by the pressure switch (16) situated on the valve manifold carrier.



012E0007.TBL

OPERATIONAL SITUATION	CONSEQUENCE FUNCTION
First system pressure loss	
Step 1 Setting point (B3.6) SYSTEM PRESSURE READY	(Pressure drops) Pressure switch contact (B3.6) opens "SYSTEM PRESSURE" alarm lamp lights solid
Step 2 Setting point (B3.5) SYSTEM PRESSURE LOW	Pressure switch contact (B3.5) opens "SYSTEM PRESSURE LOW" alarm lights solid Start adding the stand-by main pump (time delay) Both main pumps are activated External general "ALARM" lamp lights solid
System pressure build-up	
Step 3 Setting point (B3.5) SYSTEM PRESSURE LOW	(Pressure increases) Pressure switch contact (B3.5) closes Inactive during 1st pressure build-up !!
Step 4 Setting point (B3.6) SYSTEM PRESSURE READY	Pressure switch contact (B3.6) closes The stand-by main pump stops The system pressure circuit gets ready again All alarm lamps should be off External "READY" lamp lights solid

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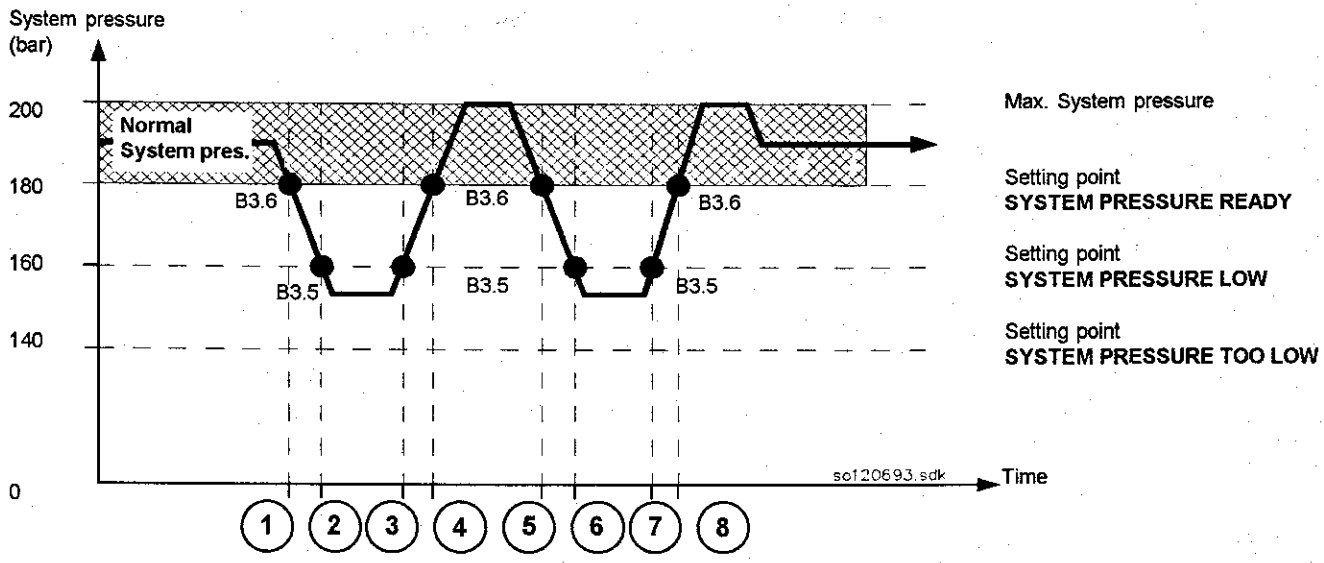
2.6.3 Automatic Start and Switch over to the Stand-by Pump

The following chart shows the automatic start of the stand-by main pump and the change over in the case of a repeating pressure loss, activated by the pressure switch (16) situated on the connection manifold.



Steps 1 to 4 are similar as descrived on chapter x.y.z (Automatically adding the stand-by main pump). To reset the alarm lamp "PUMP FAILURE" the main switch has to be switched off.

012E0008.TBL

OPERATIONAL SITUATION	CONSEQUENCE FUNCTION
Second system pressure loss with the initially switched-on main pump)	
Step 5 Setting point (B3.6) SYSTEM PRESSURE READY	(Pressure drops again) Pressure switch contact (B3.6) opens "SYSTEM PRESSURE LOW" alarm lamp lights solid
Step 6 Setting point (B3.5) SYSTEM PRESSURE LOW	Pressure switch contact (B3.5) opens "SYSTEM PRESSURE LOW" alarm lights solid "PUMP FAILURE" alarm lamp lights solid Final and firm switch-over to stand-by main pump (time delay)
Second time system pressure build-up	
Step 7 Setting point (B3.5) SYSTEM PRESSURE LOW	(Pressure increases) Pressure switch contact (B3.5) closes Inactive during pressure build-up
Step 8 Setting point (B3.6) SYSTEM PRESSURE READY	Pressure switch contact (B3.6) closes The initially running main pump stops "PUMP FAILURE" alarm lamp lights solid The system pressure circuit gets ready again All others alarm lamps should be off External "READY" lamp light solid

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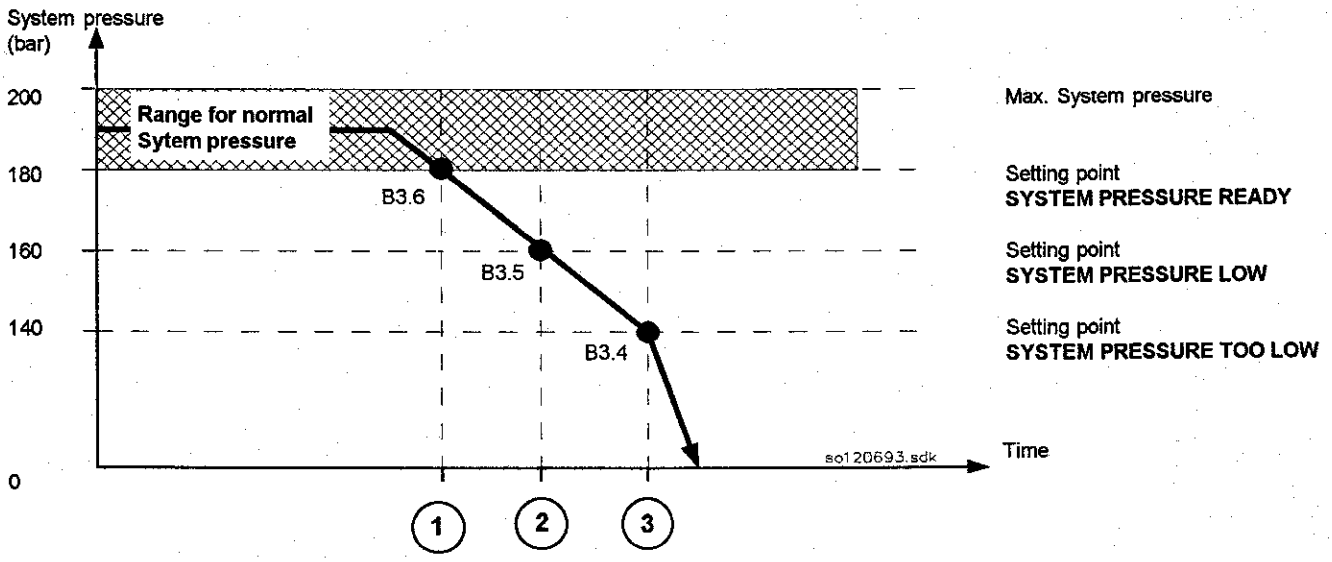
2.6.4 Complete System Pressure Loss (Emergency Shut)

All tundish gates will shut automatically in case of a complete pressure loss, even if the stand-by main pump has been added. In such a case both main pumps will then be shut down as well as to prevent any possible leakage within the hydraulic system (watch-out for pipeline leaks).



012E0009.TBL

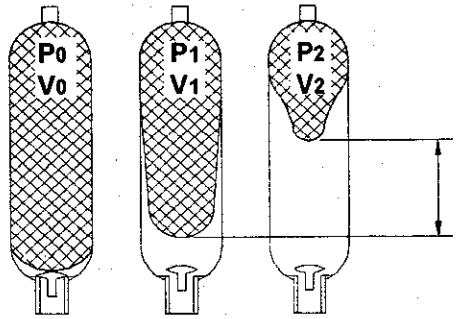
OPERATIONAL SITUATION	CONSEQUENCE FUNCTION
Sudden system pressure loss	
Step 1 Setting point (B3.6) SYSTEM PRESSURE READY	Pressure switch contact (B3.6) opens "SYSTEM PRESSURE LOW" alarm lamp lights solid
Step 2 Setting point (B3.5) SYSTEM PRESSURE LOW	Pressure switch contact (B3.5) opens "SYSTEM PRESSURE LOW" alarm lamp lights solid Start of the stand-by main pump
Step 3 Setting point (B3.4) SYSTEM PRESSURE TOO LOW	Pressure switch contact (B3.4) opens "SYSTEM PRESSSURE TOP LOW" alarm lamp lights solid Automatic emergency shut down of all gates External general "ALARM" lamp flashes External "READY" lamp goes off
Emergency shut of all tundish gates	

Jn2-770-35-40 <mp 24

2.6.5 Booster Accumulator Pressure Discharge

Fails the main pump pressure supply for a short moment, casting can go on with the remaining pressure in the booster accumulator (40) on the central hydraulic power unit. The following diagram shows the possible time left, to get the main pumps operational again.

P_0 Gas pre-charge pressure
P_1 Min. working pressure
P_2 Max. working pressure



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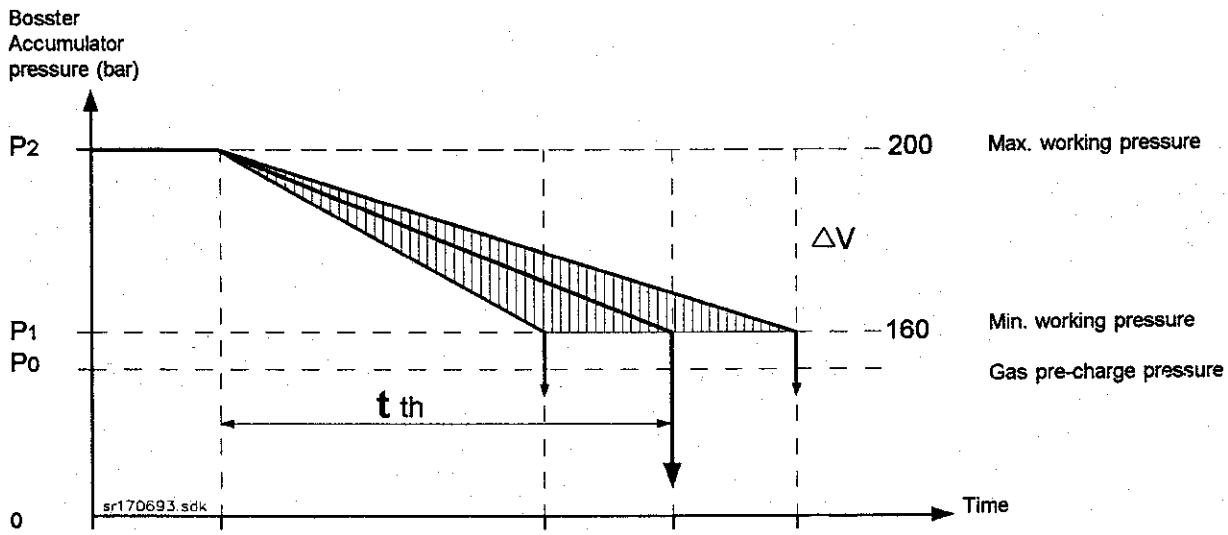
Effective hydraulic fluid volume

$\Delta V = V_2 - V_1$



Theoretical booster accumulator discharge time (in autom. op. mode):

$$t_{th} = \frac{\Delta V}{\left(\frac{n \times V}{60}\right)} = [\text{ second }]$$

ΔV = Effective hydraulic fluid volume [Liters]
n = Number of cylinders
V = Fluid consumption per cyl. (l/Min)

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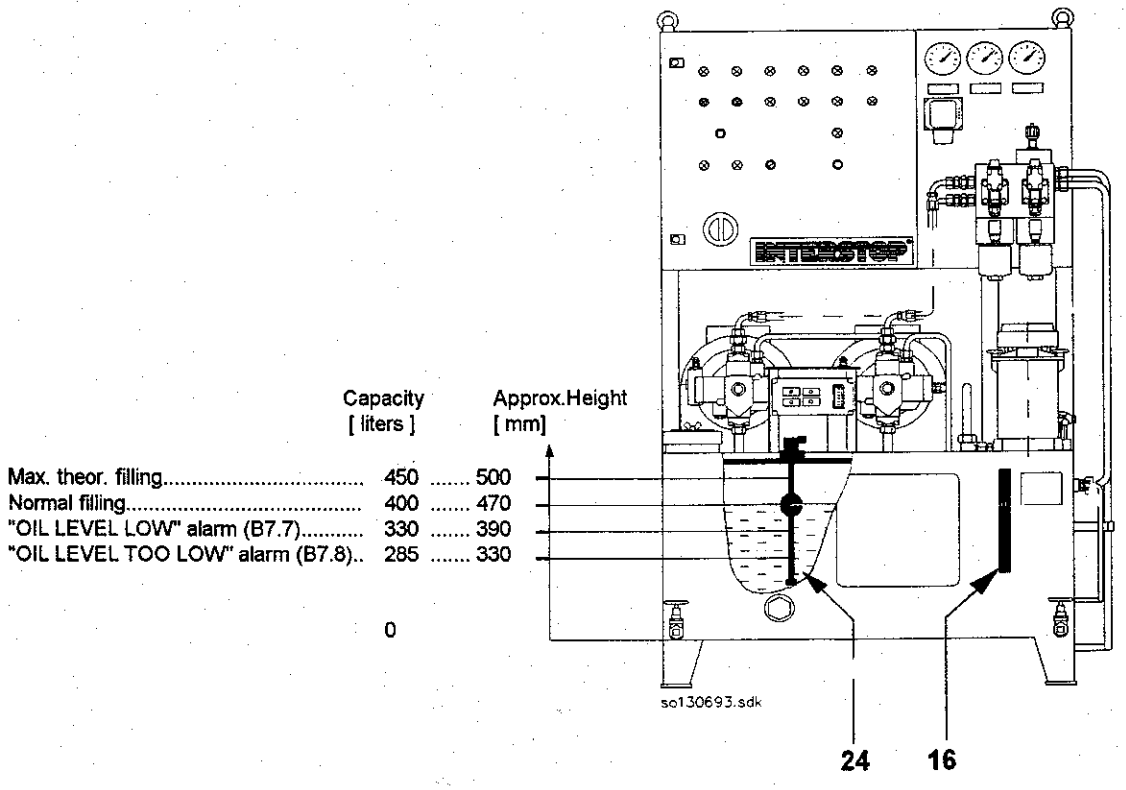
cmp25

2.7 Hydraulic Fluid Level Control

The hydraulic fluid level in the reservoir is controlled by a float switch (24). The hydraulic fluid level can also be controlled visually on the level gauge (16).



012E0010.TBL

OPERATIONAL SITUATION	CONSEQUENCE FUNCTION
Hydraulic fluid level drops	
400 liters	Normal filling capacity
330 liters OIL LEVEL LOW	Level switch contact (B7.7) closes "OIL LEVEL LOW" alarm lamp lights solid
285 liters OIL LEVEL TOO LOW	Level switch contact (B7.8) closes "OIL LEVEL LOW" alarm lamp lights solid "OIL LEVEL TOO LOW" alarm lamp lights solid Heater and all running pumps will be switches off automatically External general "ALARM" lamp flashes External "READY" lamp goes off
Emergency shut of all tundish gates	

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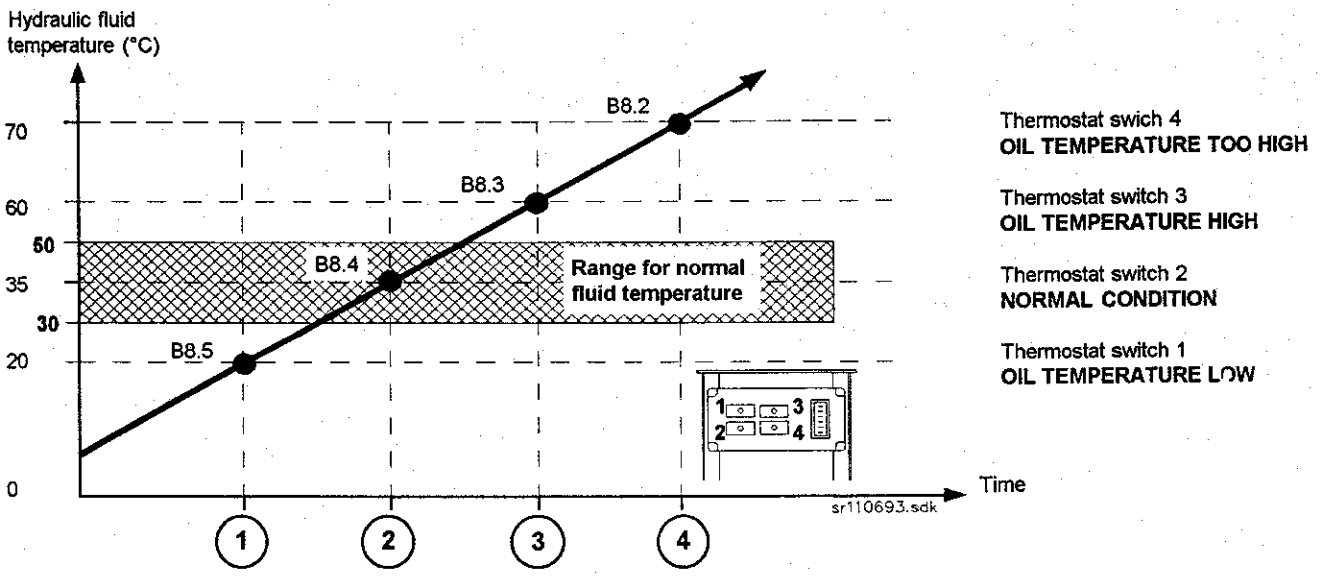
2.8 Hydraulic Fluid Temperature Control

The hydraulic fluid temperature in the reservoir is controlled by a temperature controller with 4 thermostats (25) situated on the central hydraulic power unit.The temperature can also be controlled visually on the temperature gauge (25).



012E0011.TBL

OPERATIONAL SITUATION	CONSEQUENCE FUNCTION
Hydraulic fluid temperature changes	
Temperature below 20°C OIL TEMPERATURE LOW	Thermostat contact 1 (B8.5) normal close "OIL TEMPERATURE LOW" alarm lamp lights solid Heater "ON ; Cooling circuit "OFF" Main pumps 1/2 cannot be started but remain running if already operational External "ALARM" lamp lights solid
Step 1 Temperature and/over 20°C OIL TEMPERATURE LOW	Thermostat contact 1 (B8.5) opens "OIL TEMPERATURE LOW" alarm lamp lights solid Heater "ON ; Cooling circuit "OFF" External "ALARM" lamp lights solid
Step 2 Temperature and/over 35°C NORMAL CONDITION	Thermostat contact 2 (B8.4) opens Heater "OFF ; Cooling circuit "ON" External "READY" lamp lights solid
Step 3 Temperature and/over 60°C OIL TEMPERATURE HIGH	Thermostat contact 3 (B8.3) closes "OIL TEMPERATURE HIGH" alarm lamp lights solid Heater "OFF ; Cooling circuit "ON" External "ALARM" lamp lights solid
Step 4 Temperature and/over 70°C OIL TEMPERATURE TOO HIGH	Thermostat contact 4 (B8.2) closes "OIL TEMPERATURE TOO HIGH" alarm lamp lights solid Heater "OFF ; Cooling circuit "ON" The main pumps for 2 will be switched off automatically External "ALARM" lamp flashes
Emergency shut of all tundish gates	

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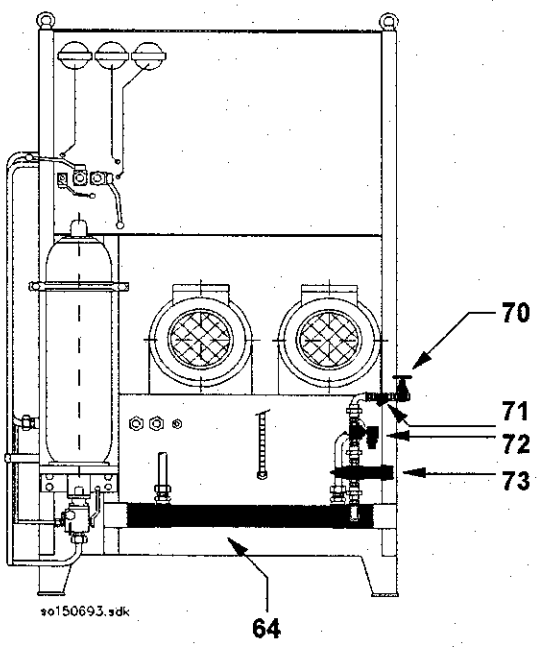
2.9 Cooling Circuit

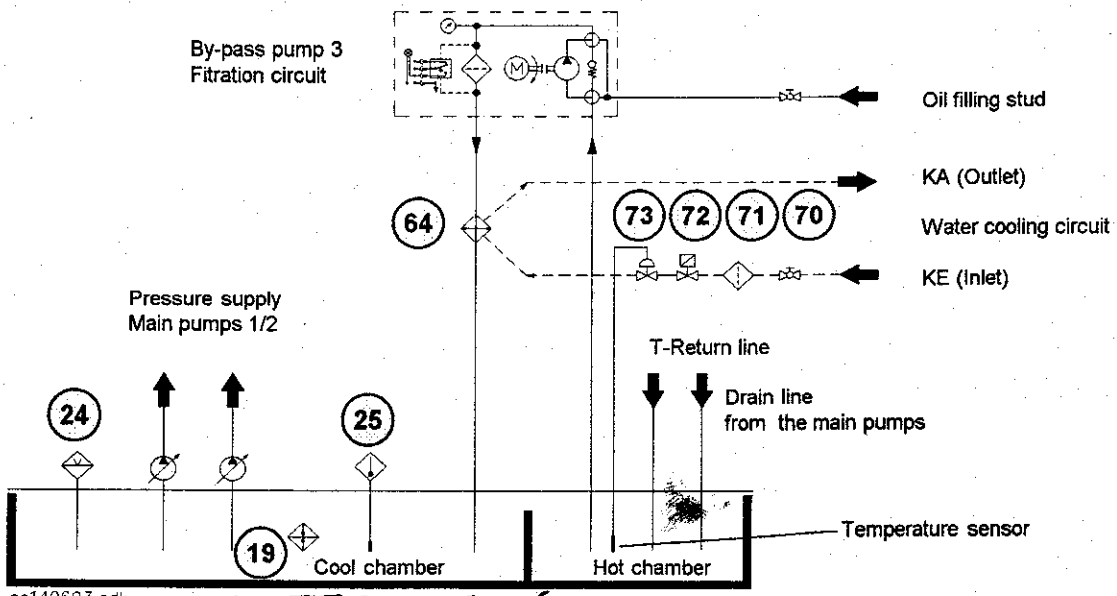
A heat exchanger (64), containing an independant water flow control valve (73) with a temperature sensor to keep the hydraulic fluid temperature within the desired working range of 35 -50°C.

The water supply will be shut-off automatically by 2-way solenoid valve (72) as soon as the fluid temperature decreases below 35° C in the reservoir. This is controlled by the temperature switch (25). The same controller activates in reserved sense the integrated heater (19).



19 Heating rod
24 Magnet operated float switch
25 Temperature controler with 4 thermostats
64 Heat exchanger (water cooled)

70 Shut off needle valve
71 Strainer
72 2-way solenoid valve
73 Water flow control valve temperature controlled



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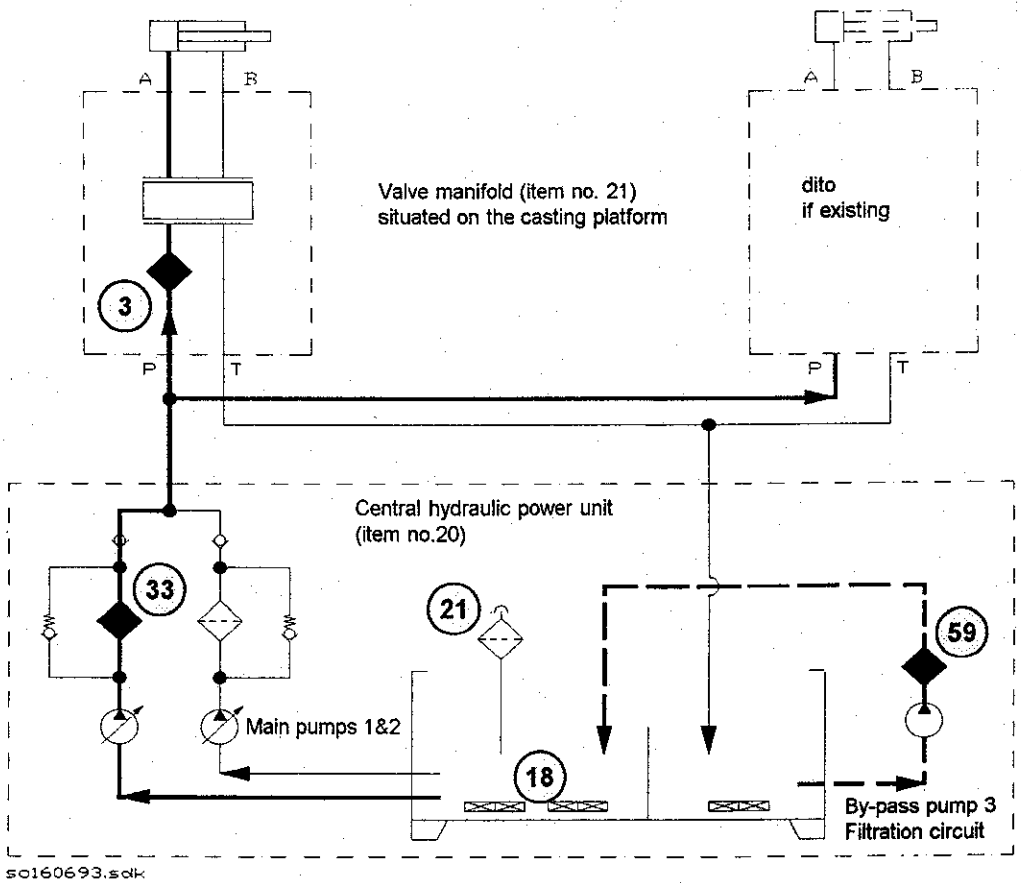
2.10 Filtration of the Entire Hydraulic System

The failure rate of oil hydraulic systems, especially of servo control circuits, which are used in continuous operation, is mainly in direct relation with the operating fluid, its maintenance and its filtration quality.
In areas with high temperatures and dust it is a must to have an optimal cooling and filtration system to prevent any unusual valve and pump failures.
All filter elements must have an absolute filtration capacity of 10 microns.

In appreciation of these facts, the following measures have been taken on the installed equipment:

59 By-pass filtration and fluid filling system
33 Pressure filter for each main pump circuit
21 Air breather on top of the reservoir
18 Magnets in the reservoir for collecting metallic particles

3 Pressure filter in P-line for each servo control valve



Important !
Only original filter elements may be used

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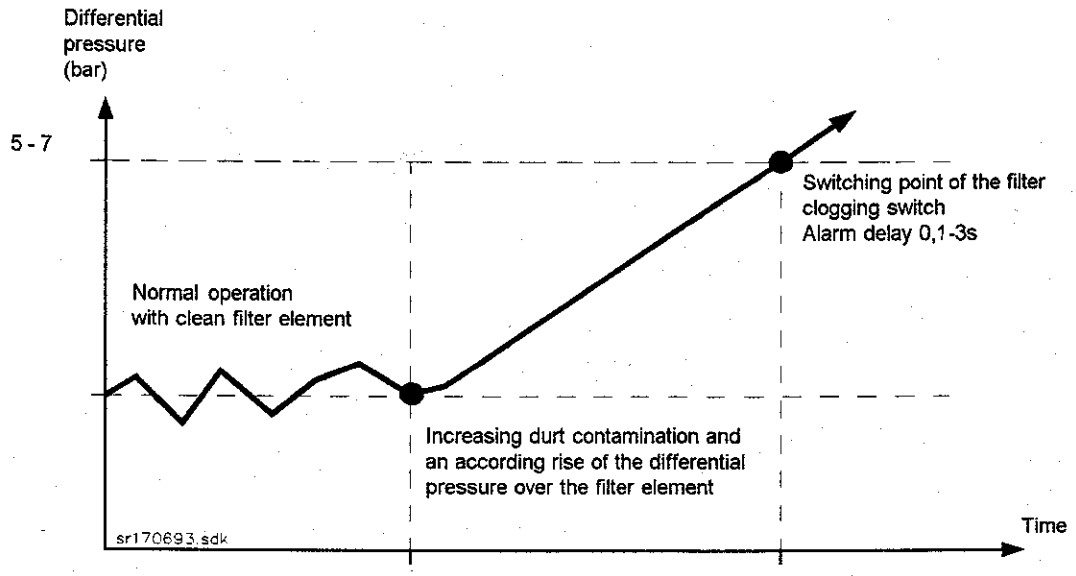
2.10.1 Filter Clogging Control

All filters on the central hydraulic power unit (item no.20) have a by-pass line, which opens for free flow when a differential pressure build-up of 5-7 bar occurs. The P-line filter on the valve manifold (item no. 21) does not contain any by-pass, to assure a perfect protection of the servo control valve.

Working wise of the filter clogging alarm:
In case of an increased amount of clogging, the differential pressure switch mounted to each filter-unit produces an alarm contact which is electronically controlled by an adjustable delay (on PLC) of 0,1-3 seconds. The "FILTER ALARMS" are indicated on the control panel situated on the central hydraulic unit (item no.20) and on the operator station (item no.4).

The following chart shows the practical differential pressure build-up within a filter unit:



Note:
The el. contamination control applies for the filters mounted on the central hydraulic power unit (item no.20) but not for the valve manifolds (item no.21). The filter sitting on the valve manifold has a mechanical contamination indication and needs to be checked visually in regular terms !

IMPORTANT !
Only original filter elements may be used for a safe functioning of the entire hydraulic circuit.

Jn2-770-35-cmp30

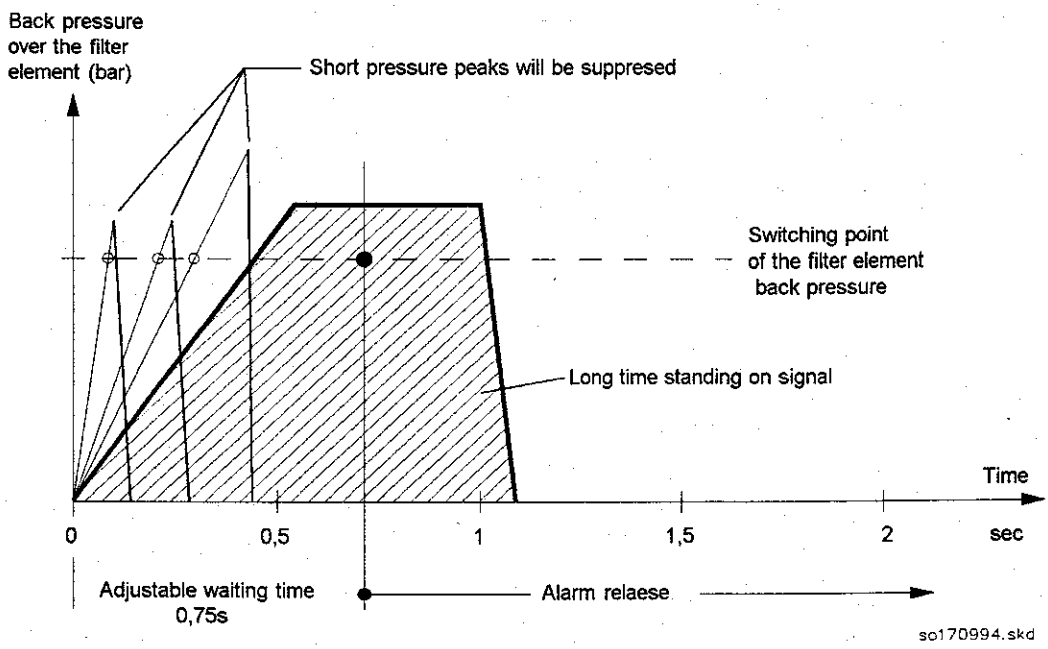
2.10.2 Pressure Peak Suppression of the Filter Clogging Indication

Pressure peaks by sudden loads e.g. oscillation in automatic operation and changes of viscosity or cold installations can originate a faulty starting "FILTER ALARM". To eliminate this effect, any short-time stand-in line signal is electronically (via PLC) suppressed.

This method applies for all filter clogging alarms (execpt for visual clogging control) on the entire hydraulic system.

The relaesed alarm remains until the corresponding clogged filter element is exchanged and the differential pressure is back within an acceptable range.

Filters (33/59) on the central hydraulic power unit can be exchanged separately during non periodical exchange dates. If high pressure filters (2/3) on one of the valve manifold (item no.21) is clogged, it is advisiable to exchange all filter elements at the same time.



Important note for the operator:
There exists a direct relation between quality and operational efficiency of a filtering system and trouble incidence, working life and finally also economy of an entire hydraulic system particularly in case of installations which are operated with non-mineral fluids.

IMPORTANT !
Appropriate maintenance instructions have to be respected by the operator in his own interest. Any alterations of the filter element exchange periods are only permissible if corresponding written charts are at hand.

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2.11 Filling/Filtering and Pumping Out of the Hydraulic Fluid

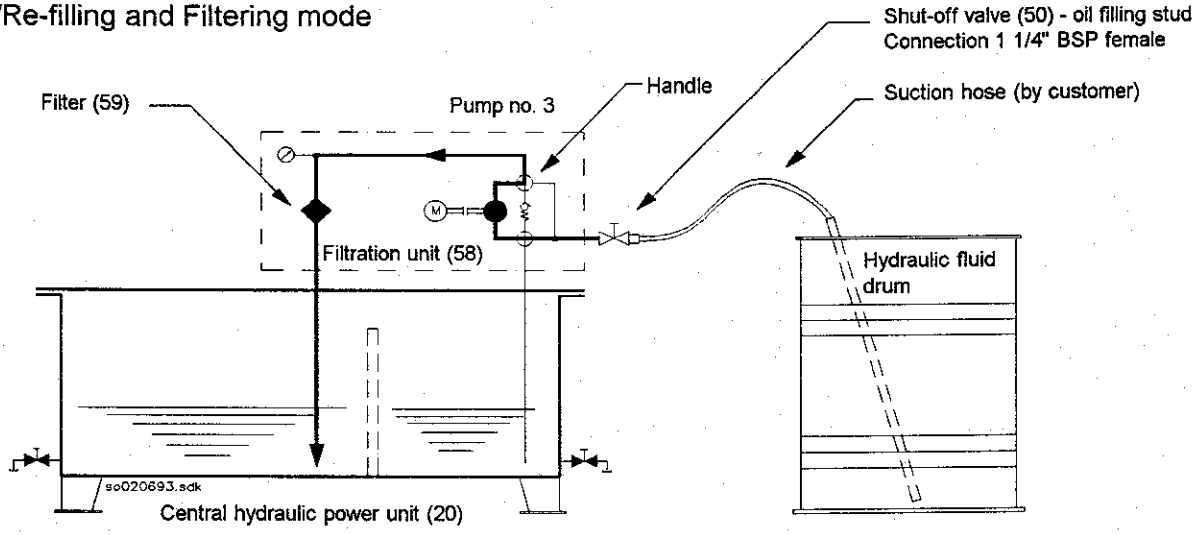
It is well known that hydraulic fluids from drums contain dirt particles up to 30 microns in a large amout.

To prevent already pre-rinsed installations or units which have been operational for a longer period of time from futher dirt during filling or refilling the oil reservoir, a special oil filtering unit (58) is provided on all **INTERSTOP** hydraulics.

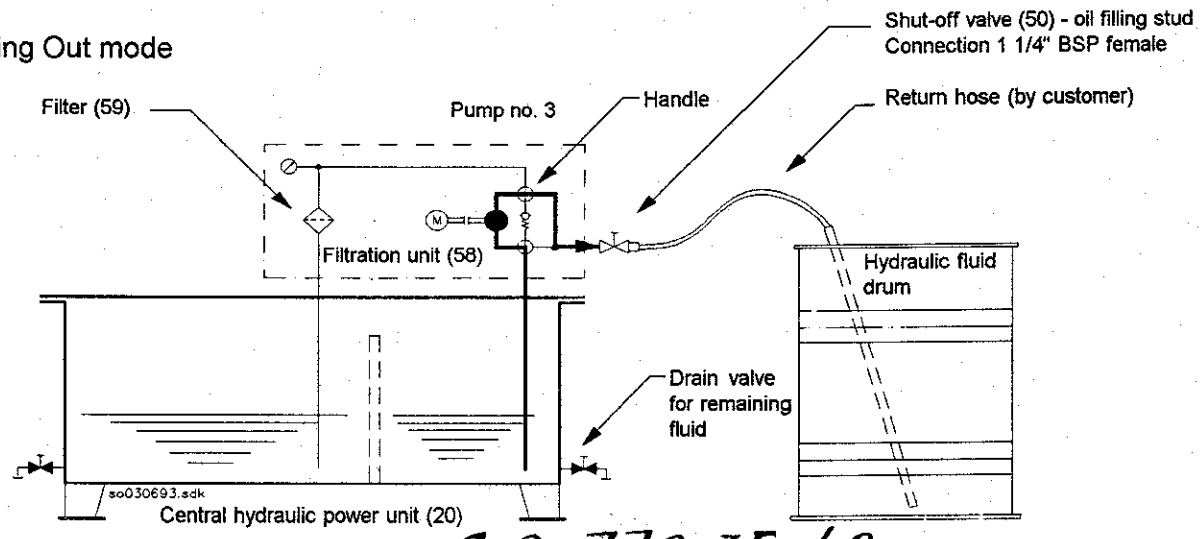
The by-pass filtration circuit (pump no. 3) contains a valve position which leads the new fluid over the high capacity cartridge (59). For this purpose the suction hose has to be connected to the 1 1/4" BSP female shut-off valve (50) on backside of the central hydraulic power unit (20).

The main handle on the filtration unit has then to be brougt into "SUCTION POSITION".

Filling/Re-filling and Filtering mode



Pumping Out mode



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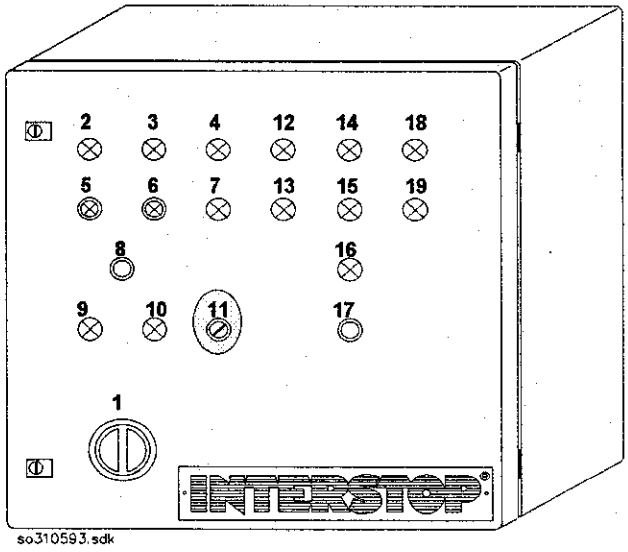
The filling procedure can be activated via service key switch (11) on the control panel situated on the central hydraulic power unit (item no.20).



Control panel situated on the
Central hydraulic power unit

1	Main switch	
2	Pump 1 failure	Alarm lamp red
3	Pump 2 failure	Alarm lamp red
4	Pump 3 failure	Alarm lamp red
5	Pump 1 On	Iluminated push-button green
6	Pump 2 On	Iluminated push-button green
7	Pump 3 On	Indicating lamp green
8	Pump 1&2 Off	Push-button red
9	Heating On	Indicating lamp green
10	Cooling On	Indicating lamp green
11	Service key pump 3	Key-switch
12	Oil level low	Alarm lamp red
13	Oil level too low	Alarm lamp red
14	Oil temp. too high	Alarm lamp red
15	Oil temp. high	Alarm lamp red
16	Oil temp. low	Alarm lamp red
17	Lamp control	Push-button yellow
18	Pressure low	Alarm lamp red
19	Filter alarm	Alarm lamp red

Necessary steps for filling/re-filling the reservoir:

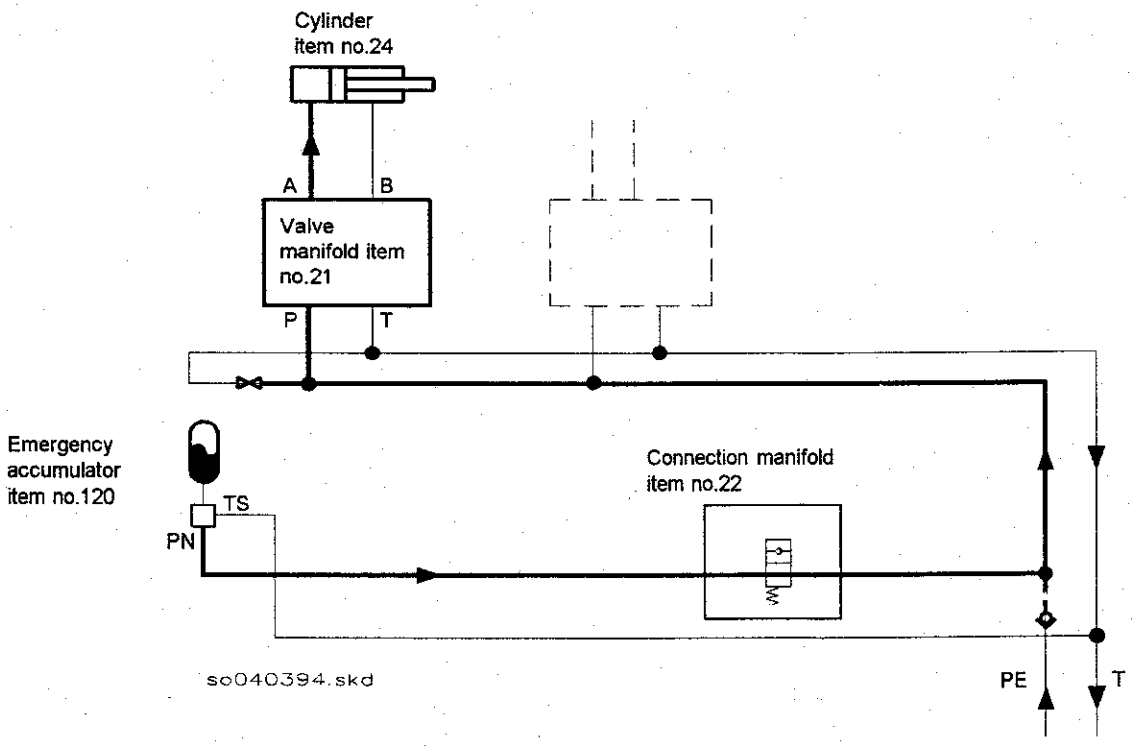
1. Switch by-pass pump 3 (filtration circuit) "OFF" by key-switch (11)
2. Reverse selection valve on the by-pass pump 3 (58) in filling mode. Connect the suction hose to the oil filling stud (50).
3. Switch by-pass pump 3 "ON" by key-switch (11). Watch filling degree on oil level gauge (16).
4. Resverse selection-valve back to filtering mode.

DO NOT OVERFILL THE FLUID RESERVOIR !

Гидравлическая система

2.12 The Hydraulic Emergency System

The following simplified chart shows the relief functions and flow of the emergency pressure in case of an emergency shut.



The emergency system designed and built-up to handle unusual situations is based on a fully independant powered working unit. A self-controlled emergency battery is hardwired to the emergency valves on the manifolds (item no's 21 and 22).

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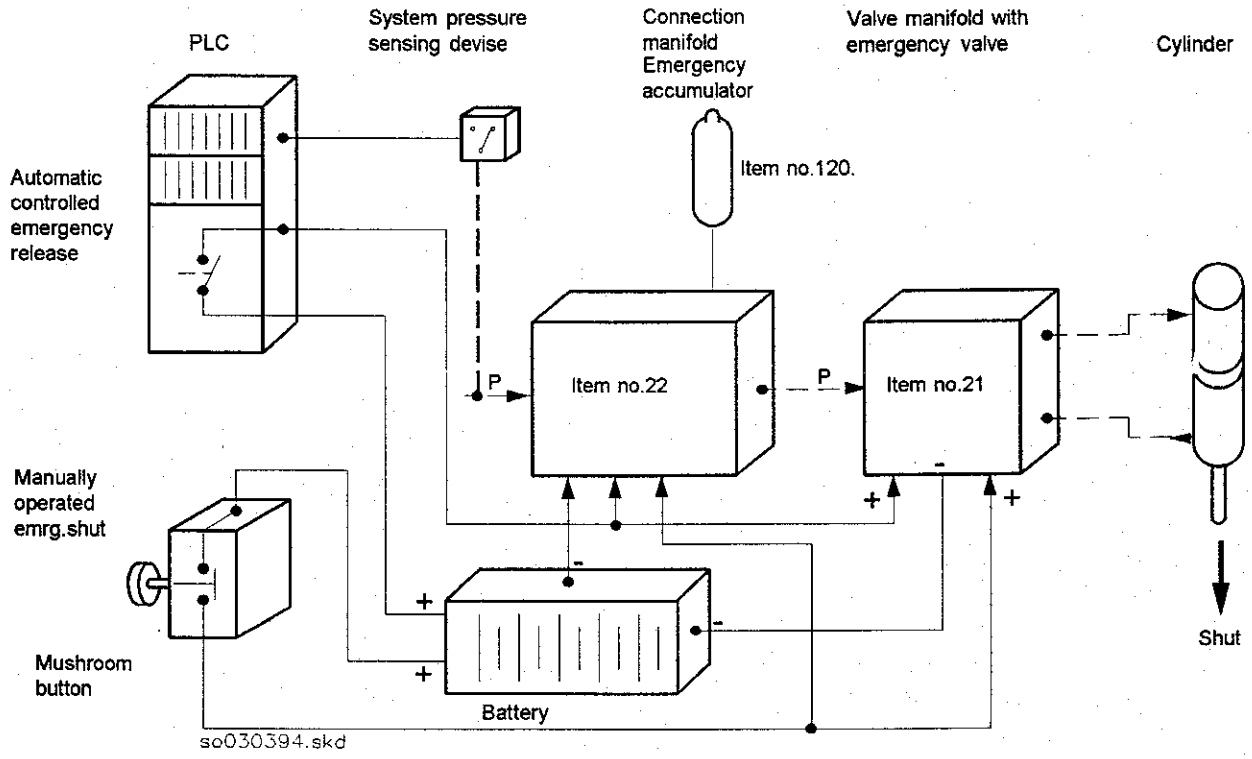
Serving for this only purpose, the emergency accumulator (item no.120) is designed to contain enough capacity to shut all connected gates within the required safe pressure range which is 200 to 140 bar resp. 2900 to 2030 p.s.i.

From the operational point of view the emergency system has an overriding function, i.e. any other operational mode will be shut-down in case of an emergency release.

The gates can be shut individually or together depending on the actual requirement.

The chart below shows the el. signal flow during an emergency shut



Jn2-770-35-40 cmp35

There are two possible ways to execute an emergency shut:

- Automatic emergency shut generated by the PLC
- Manual operated emergency shut released from the operator station (item no. 3) or released from the general emergency button located somewhere on the escape route.

Automatic emergency shut generated in case of:

- Hydraulic fluid teperature is too high
- Fluid level in reservoir is too low
- System pressure too low
- A general power supply failure

A further automatic emergency shut of a single tundish gate occurs also in case of:

- a broken signal cable
- overflow protection (depending on the level recovery situation)
- early breakout detection (depending on the level recovery situation)

The previous described emergency shut will be executed direct over the servo-valve and not by the emergency system.

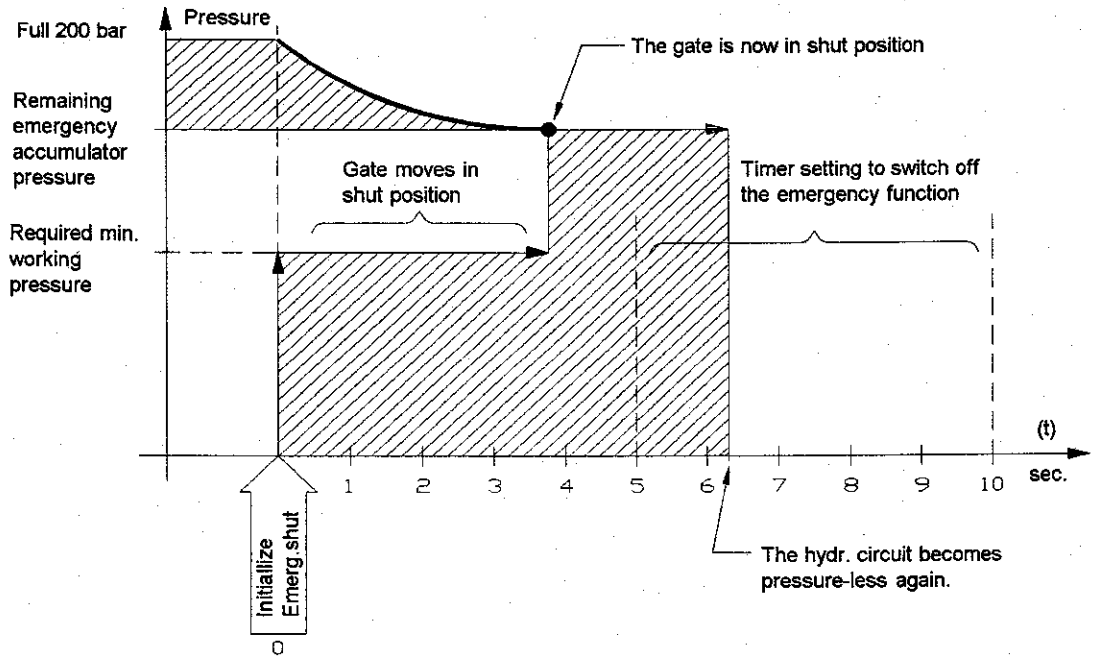
Each operator station (item no. 3) has its own individual emergency shut button.

All gates will be shut simultaneously if an emergency shut over the "general emergency shut button" has been released, no matter whether the car is in casting position or not.

It is strongoly recommended by the supplier to use and check the emergency system periodically for the following reasons:

1. **To train operators in using the system, in case it would be once required.**
2. **To see and resolve any obstructions in a way of preventive maintenance.**

The emergency shut-off process, whether manually or automatically released, is controlled by an adjustable timer:



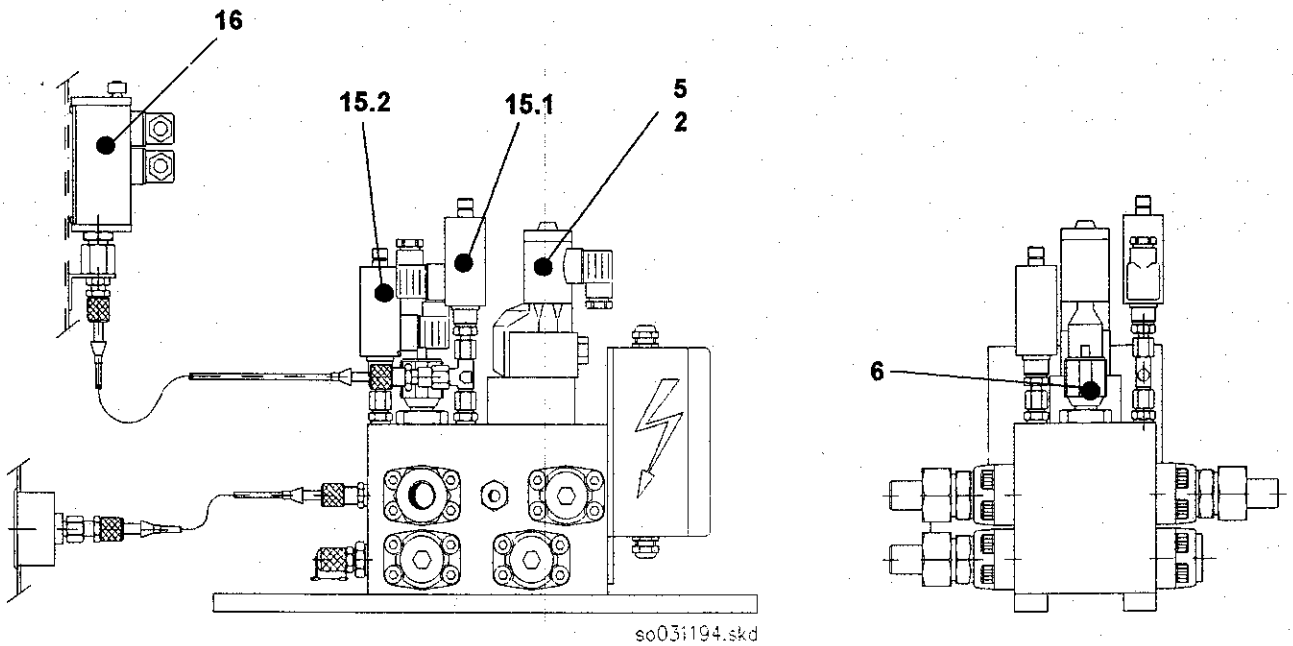
This method enables to get all lines free of pressure after an executed emergency shut, in order to prevent any hazards in case of an accident on the remaining installation.

Jn2-770-35-40 cmp37

Поз. 22

2.13 Connection Manifold Item No. 22

Layout and functions:



2 2/2-way high flow check-valve

5 Pilot check-valve

6 Throttle valve for accu pressure flow control

15.1 To low pressure, initiallizing an autom. emergency shut 3B4

15.2 Pressure switch to control the emergency accu pressure 3B3

16 Indication of normal and low pressure 3B5 / 3B6

Note :
The pressure switches of the tundish car in casting position will be selected by the PLC automatically for the system and emergency pressure surveillance.

Arranged on the tundish car near the emergency accumulator, the connection manifold (item no.22) fulfills the following purposes:

- Central distribution of the pressure and return lines to and from the hydraulic power unit (item no.20) and the valve manifolds (item no.22).

- Carrier of the system pressure control switches:

  3B4 < 135 bar, emergency shut of all tundish gates of the car in casting position
  3B5 < 160 bar, stand by pump "ON"
  3B6 > 180 bar, system pressure o.k.

- Carrier of the emergency pressure control switch:

  3B3 < 180 bar, emergency pressure "LOW"

- Carrier of the flow control and the shut-off poppet valve, of the emergency pressure circuit.

Detailed description of the different functions i.e. emergency pressure relief (item nos.2-5) see under chapter 2.15.

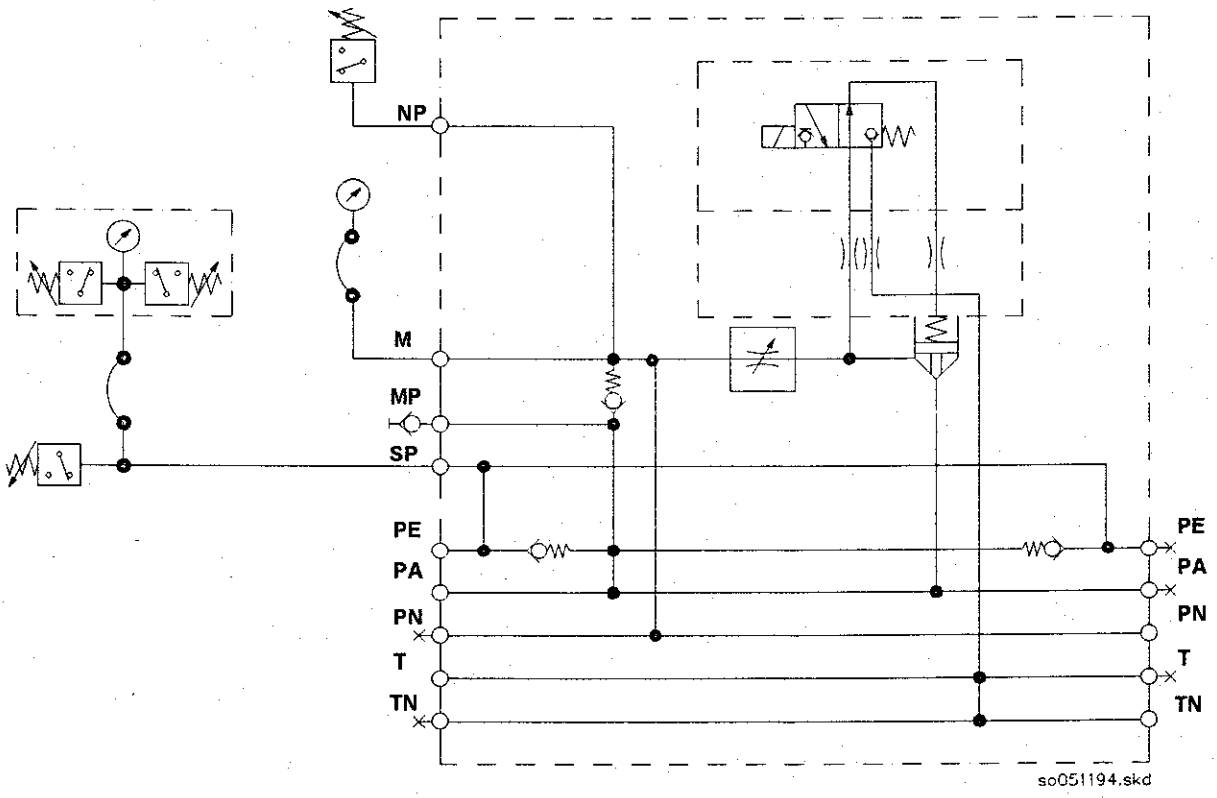
A small pressure gauge alternatively connected to either measuring ports M or MP enables an easy reading resp. checking of the realistic emergency or system pressure on the tundish car. Futhermore, the gauge can also be used for setting the pressure switches.

The cartridge-type throttling valve (item no. 6 will be set at throughput of approx. 60 l/min (emergency flow).

ATTENTION:
Adjustments or re-adjustments should be carried out only by qualified personnel to avoid any malfunctions of the hydraulic system.

3n2-770-35-41
cmp 2

HYDRUALIC FLOW DIAGRAM OF THE CONNECTION MANIFOLD

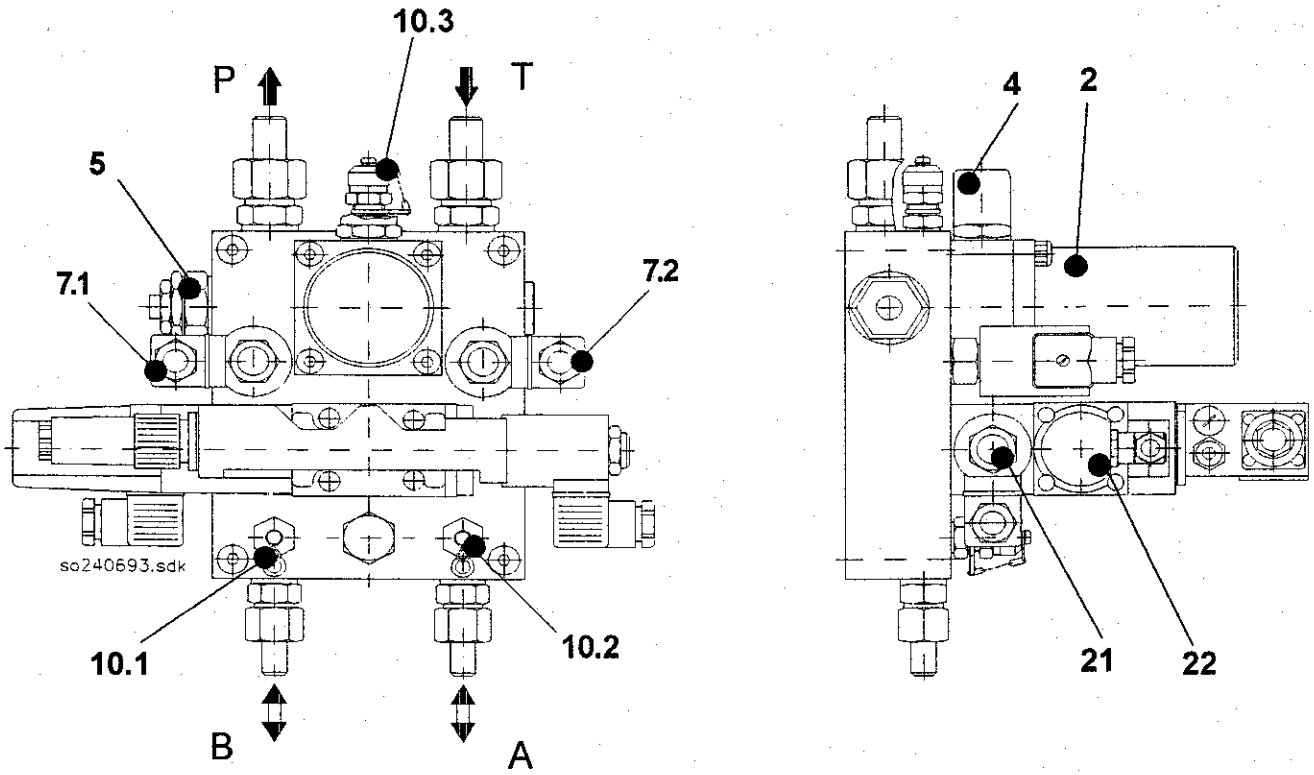


3n2-770-35-41
cmp 3

Поз. 21

2.14 Valve Manifold Type TS/S2-1.0 (Item no. 21)

Assembly layout:



Parts legend:

5	Shut-off valve P-line	2	P-line pressure filter
7.1/7.2	Emergency shut valve	4	Visual filter clogging indicator
21	Shut-off valve A/B-lines	10.1/10.2	A/B-lines measuring port
22	Servo control valve	10.3	P-line measuring port

Зп2-770-35-42
Стр 1 всего 9 стр

Functions:

The multi-functional valve manifold fulfils all the important control steps of the electro-hydraulic position control loop. It is important that the valve manifold is mounted as near as possible to the gate respectively its cylinder for accuracy reasons of the servo loop.

The main control functions of the valve manifold are as follows:

2.14.1 Automatic start-up, Automatic mold level control

2.14.2 Submerged nozzle change

2.14.3 Overflow protection

2.14.4 Manually controlled casting

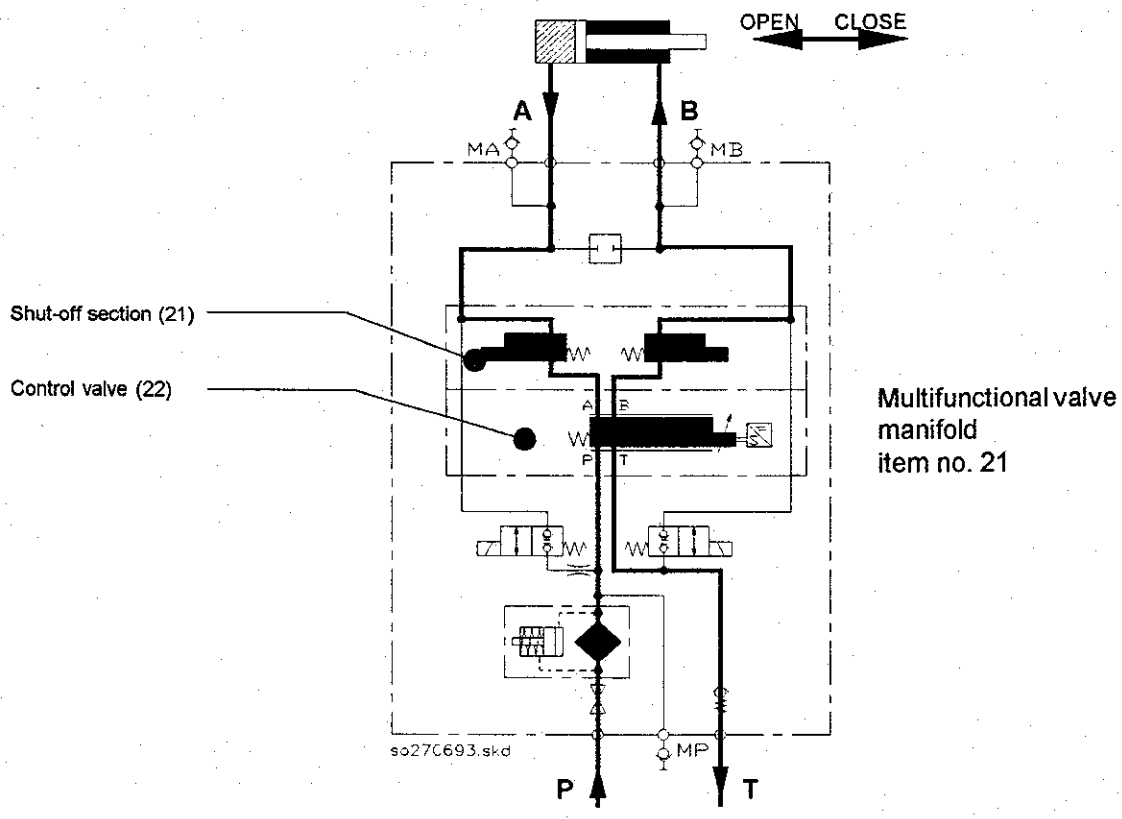
2.14.5 Emergency shut

2.14.6 Filtration arrangement on the valve manifold

These specific functions are explained in the following charts.

Jn2-770-35-42
cmp 2

2.14.1 Automatic Start-up, Automatic Mold Level Control

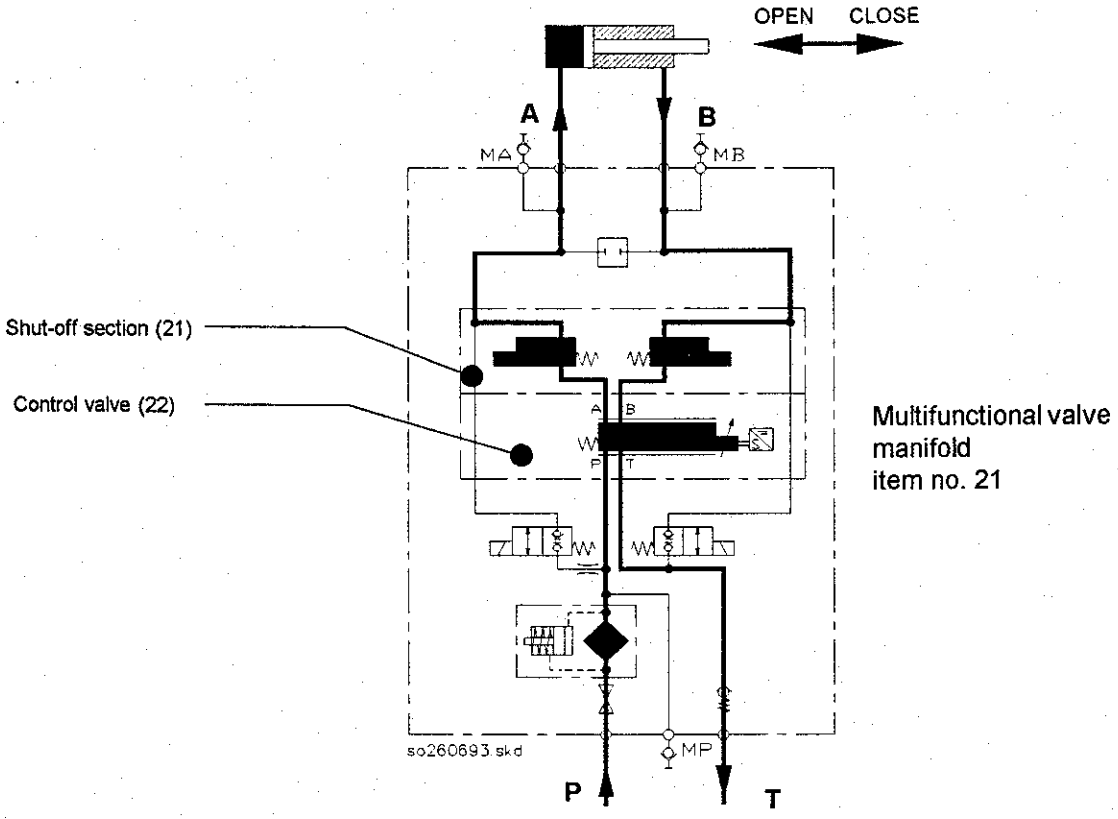


013E1100.TBL

Function	Initialized from	Subsequent hydraulic function	Course of motion at tundish gate
Atomatic start-up	Operator panel (item no.3)	Shut-off section (21) is in "OPEN" position. Operated by the pos. controller the control valve (22) directs the flow to the desired exit A or B.	The cylinder (item no. 24) moves oscillating with a clearly given amplitude and frequency. More correction will occur, depending on the deviation of the preset and actual mold level.
Automatic mold level control	PLC (item no. 1&2)	see above	see above

3n2-770-35-42 cmp 3

2.14.2 **Submerged Nozzle Change** (cast interrupt manually activated)

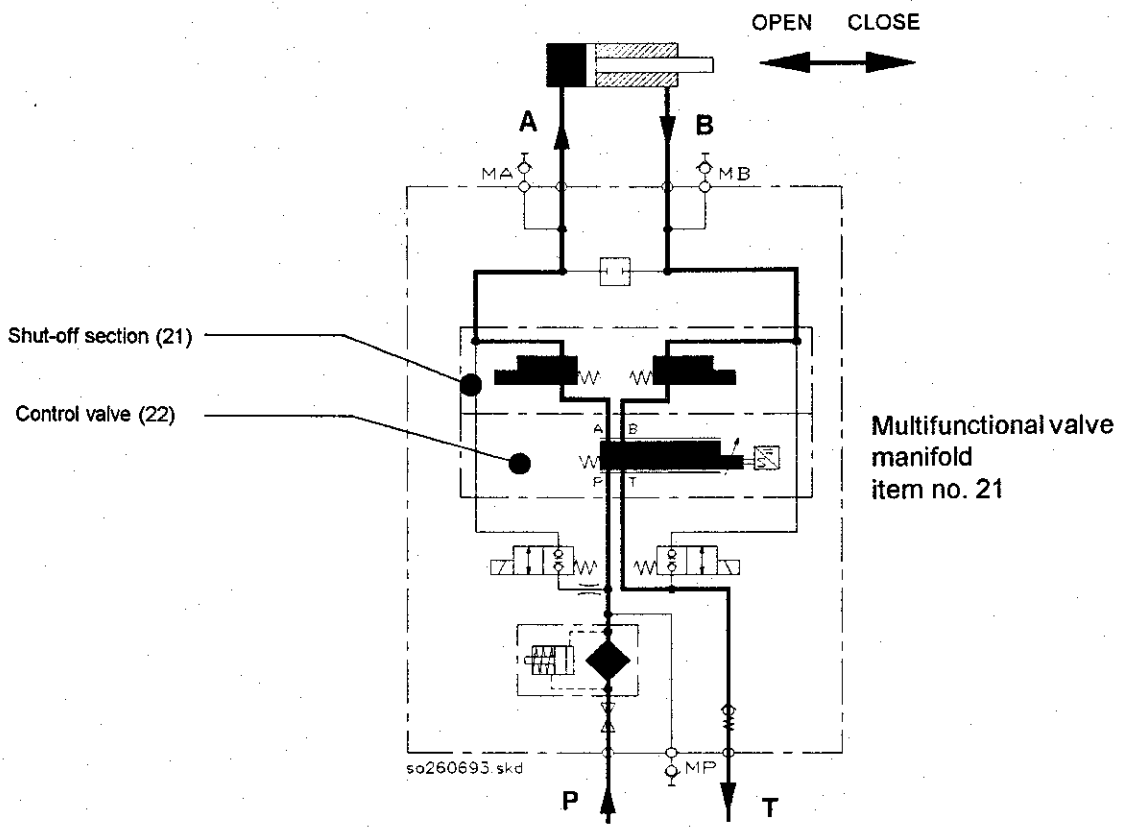


013E1102.TBL

Function	Initialized from	Subsequent hydraulic function	Course of motion at tundish gate
Initalize cast interrupt "START"	Operator station (item no.3)	Shut-off section (21) is in open position The control valve (22) moves the cylinder to close position	The slide gate will be closed completely
Submerged nozzle will be changed mechanically			
Initialize cast interrupt "END" (only possible if withdrawal speed has stopped)	Operator station (item no.3)	The proprtional control valve (22) moves the cylinder into fully open, then back into the start position.	The tundish gate opens fully for approximatelly 2 seconds and moves back into start-up position and oscillates More correction will occur, depending on deviation of the preset and actual mold level

Jn2-770-35-42 cmp 4

2.14.3 **Overflow Protection** (automatic cast interrupt)



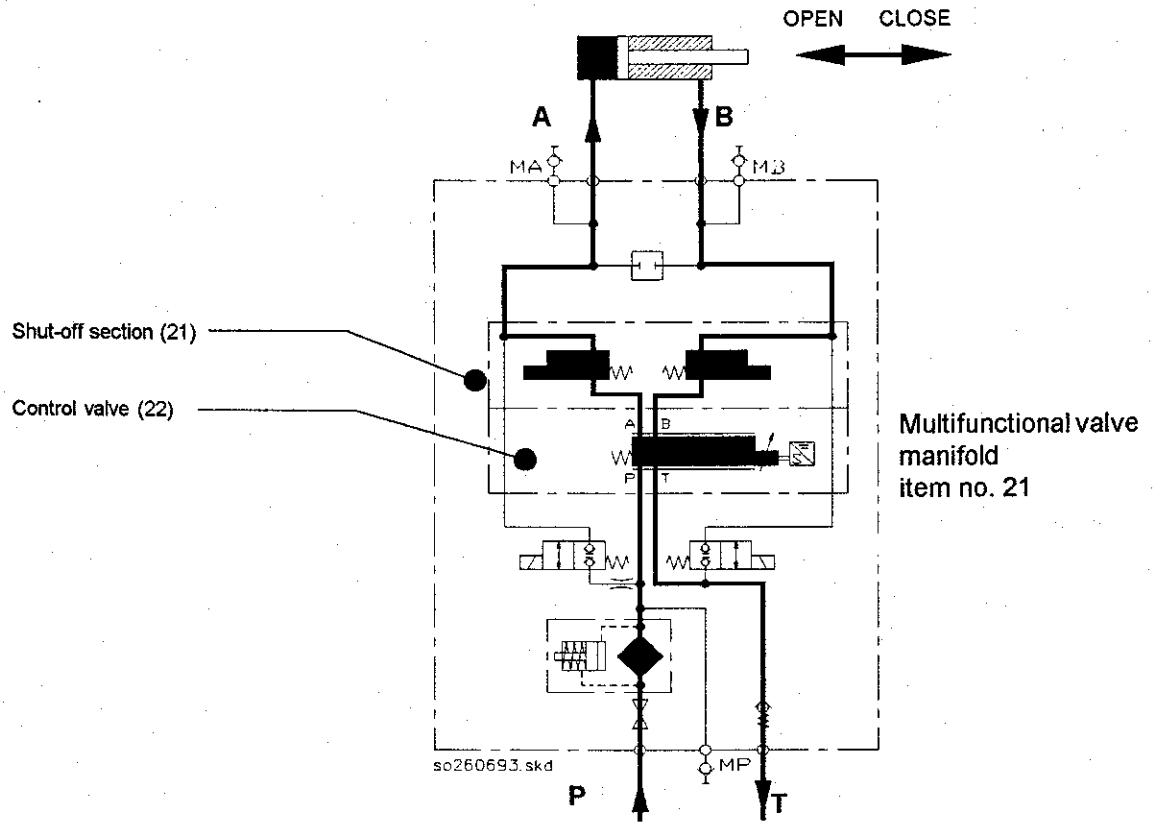
Note:
Restart is possible with initializing "CAST INTERRUPT END" button (see chapter 3.3.X.Y.4)

013E1101.TBL

Function	Initialized from	Subsequent hydraulic function	Course of motion at tundish gate
Mold level too high	Mould level measuring system and PLC	Shut-off section (21) remains in open position. The control valve (22) moves the cylinder into an allmost throttled position.	The tundish gate moves to a close position (edge of the hole position)
Mold level drops within 3 sec.	see above	see above	The tundish gate opens automatically level control takes over again
Mold level does not drop	see above	The control valve (22) brings the cylinder in its fully shut position	The tundish gate will be closed completely

3n2-770-35-42 CTP5

2.14.4 Manually controlled casting

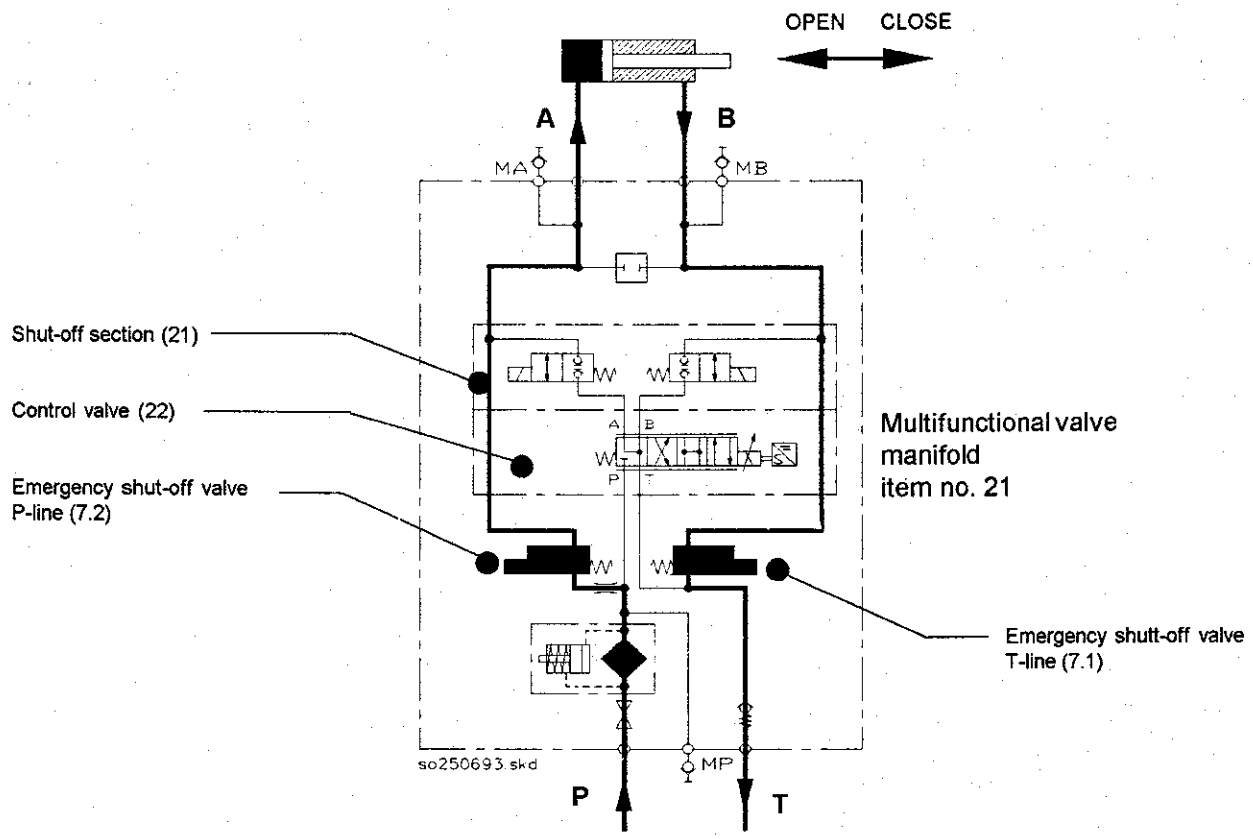


013E1103.TBL

Function	Initialized from	Subsequent hydraulic function	Course of motion at tundish gate
Manually controlled casting	Pendant (item no. 12), or push buttons on operator panel (item no. 3)	Shut-off section (21) is in "OPEN" position. Operated over push buttons the control valve (22) directs the flow to the desired exit A or B.	The cylinder moves as long as the proportional control valve (22) is activitated in either direction.

In2-770-35-42 cmp 6

2.14.5 Emergency Shut

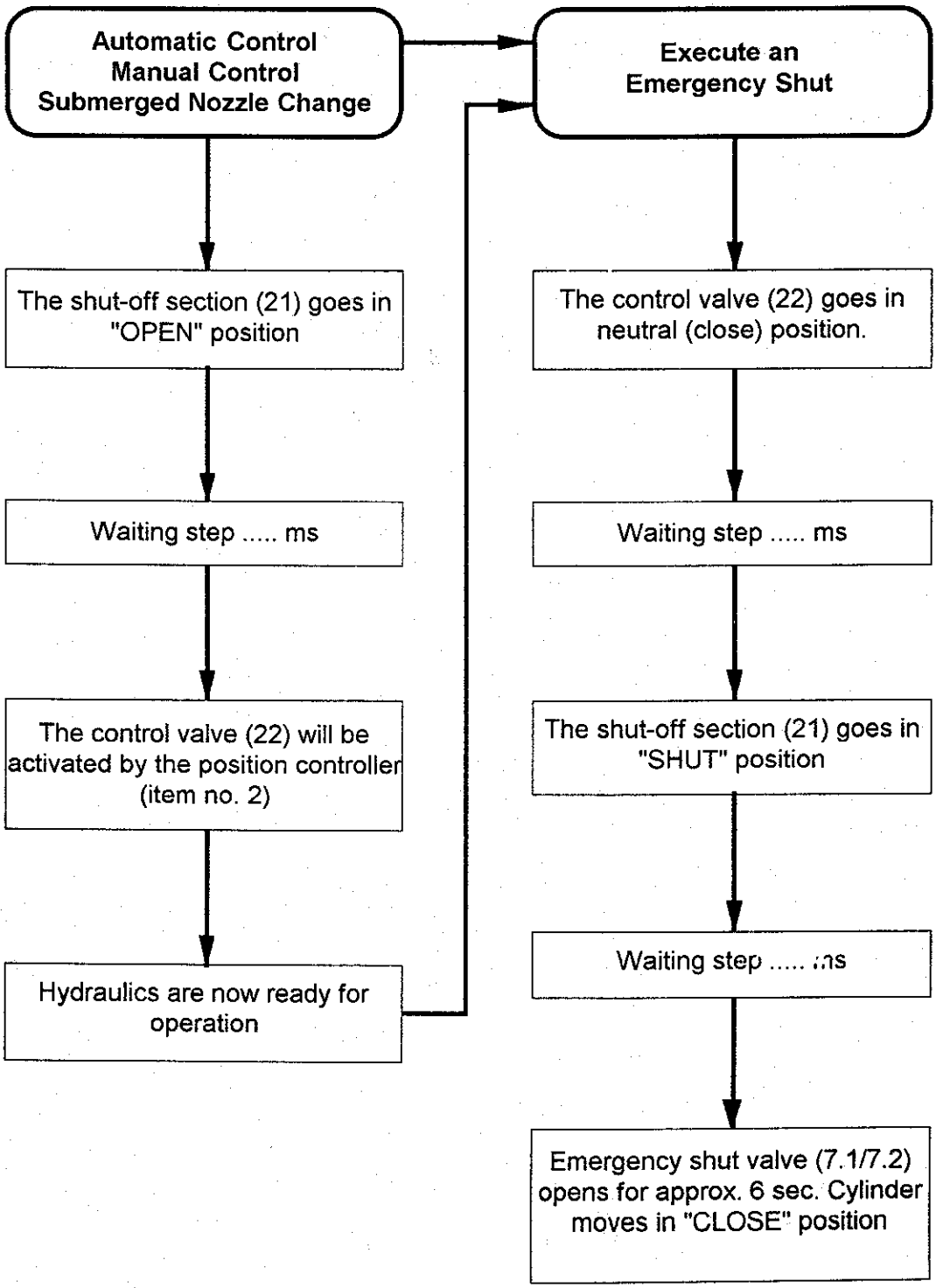


013E1104.TBL

Function	Initialized from	Subsequent hydraulic function	Course of motion at tundish gate
Emergency shut	PLC in item no.1 or 2 Operator station item no. 3 General emergency shut button item no. 104	The control valve (22) goes in neutral position. The shut-off section (21) shuts. The emergency shut valves (7.1/7.2) do open to move the cylinder into a close position. The emergency shut valves (7.1/7.2) remain activated for approx. 6 sec., controlled by a timer function.	The tundish gate moves into "CLOSE" position with a speed of approx. 35 mm/s.

3n2-770-35 cmp7

To eliminate shocks and early destruction of the valves, all switching functions are carried out sequentially, controlled by specific PLC operating steps. This operational principle guarantees quick mode changes, free of pressure peaks within the hydraulic system.



Note :
Do not forget to unlock the emergency mushroom button, after an emergency shut of any gate has been carried out !

2.14.6 Filtration arrangements on the valve manifold

The hydraulic fluid coming from the hydraulic pressure supply system is generally filtered to 10 microns (absolute) particle size. This filtration grade is sufficient for a safe operation with normal directional valves. But to follow the recommendation of the servo technology,an additional small capacity High-Pressure Filter is provided on the valve manifold (item no. 21) to avoid any malfunctions.

Thise P-line filter (2) which has no bypass-line, will protect the proportional or servo control valve (22) with a capacity of 10 microns absolute.

Important!

The above descriped filtration has a real protection function in order to guarantee a perfect operation of the valves and has been designed to serve only for this purpose. It is important to accept the fact, that the filter can only serve its purpose correctly, if the pressure fluid coming from the hydraulic pressure supply system is clean, regarding particle size and with a pH-value properly maintained.

Any filter element contamination on the above filter is shown on the visual filter clogging indicator (4), which is separately allocated.

It is advisable to check periodically and if necessary to change the filter element.

(See also chapter "MAINTENANCE RECOMMENDATION")

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INTERSTOP

Спецификация оборудования
Order Parts List
гидроагрегата типа А02-5
CENTRAL HYDRAULIC POWER UNIT TYPE A02-5
к черт. Эл2-770-35-43

Part no.: **105680** Project no. 2014/419
Dwg no. : ROKOP
kg/piece:

Page : 1
Print : 09/06/95
Issue : 07/03/95
Doc no. : 8129

3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit

Item no.	20
Unit no.	H-5385
Assembly drawing	B116762
Hydraulic flow diagram	B116763
General hydr. flow diagram	.....
Electrical diagram	E107145
Main power supply	3x380V / 50 Cycl.
Operating fluid	Quintolubic 822-300

Standard Farbantrich: RAL 7023

1 **107384** E103864 2 pcs
AC MOTOR 11/12,5 kW
380-420VD/660VY 50 Cycl. 1455 Rev/min
MBT 160M MK 161 004-BD
440-480VD/-- 60 Cycl. 1755 Rev/min
INSUL.CL.F IP55 B5

2 **105681** E103965 2 pcs
COUPLING SIZE 38/45
35H7x45/42H7x45
MAT:GG/92 SHORE A

3 **109660** 2 pcs
BELLHOUSING PL 350/15/05

4 **112314** E104523 1 pcs
RADIAL PISTON PUMP 32 ccm/Rev
ADJ.PRESSURE COMPENSATOR/FLOW LIMITED 21ccm/Rev
0514 R18 A1 RPV32 SM28 FY28

6 **109148** 2 pcs
BASE FLANGE 4F 350

8 **104425** 2 pcs
ELASTIC FLANGE D=26-30mm FTA 2630

Эл2-770-35-45 стр1 всего 4

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Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
11		**114623** HYDRAULIC HOSE (HP) ND16 x 1,3m (M30x2) STRAIGHT-90° GH10222-10/2781-10/GH10622-10	E108946		1	pcs
12		**114624** HYDRAULIC HOSE (HP) ND16 x 0,9m (M30x2) STRAIGHT-90° GH10222-10/2781-10/GH10622-10	E108946		1	pcs
13		**104057** CHECK VALVE DN16 RHZ 20-PSR-ED VITON	E104056		2	pcs
15		**104419** OIL RESERVOIR 400 L			1	pcs
16		**103851** OIL LEVEL GAUGE SIZE 254 FSA 254.1.1/12	E103848		1	pcs
17		**103982** GATE VALVE DN 25-1" AHA 60 NO.51 060-025	E103905		2	pcs
18		**104214** MAGNET D/d=80/20mm 106 510	E104214		4	pcs
19		**105927** HEATING ELEMENT O/52 1,1kW 380V R2" D/L=52/700mm NIPPLE,BARREL JACKET MAT:1.4571 MS-SCREW CAP WITH COVER;CABEL INSERT RADIAL,IP65	E105927		2	pcs
20		**103782** OIL FILTER-AIR BREATHER FILTER NLF III 3-40 P10	E103866		1	pcs
21		**104418** FILTER ELEMENT SIZE 004 7.004 P10	E103866		1	pcs
24		**104649** FLOAT SWITCH-MAGNET OPERATED L1=200mm L2=250mm AFVSS-L300-SVK	E104227		1	pcs
25		**104064** TEMPERATURE REGULATOR SERIE KMA 51.00 4 TERMOSTATE AND TEMPERATURE GAUGE 5121. 4x 321 .TFW.362	E104064		1	pcs
30		**114633** BASE BLOCK (A02) 230x165x130 HYSI-004A			1	pcs

3n2-770-35-45 cmp

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
31		**113418** PRESSURE RELIEF VALVE SIZE 10 315 bar 24VDC SUBPLATE DBW10A2-5X/315/6AG24NZ4V			2	pcs
32		**103944**	E103856		2	pcs
		PRESSURE FILTER SIZE DF 240 P WITHOUT FILTER ELEMENT DF 240 PD1.0/L24-V-BVP				
33		**103965**	E103868		2	pcs
		FILTER ELEMENT SIZE 0240D BETA MICRON BN/HC 10 MICRON 0240 D 010 BN/HC/-V				
34		**103840**	E103836		2	pcs
		CHECK VALVE-CARTRIDGE RB 3 VITON				
35		**103901**	E103900		1	pcs
		THROTTLE CHECK VALVE SIZE 16 SUBPLATE DRVP-16-1.1/0-V				
40		**108797**	E112730		1	pcs
		ACCUMULATOR 24L NBR (PERBUNAN) BLADDER SB330-24A1/112-A-330A				
41		**112752**			1	pcs
		SAFETY AND SHUT-OFF BLOCK DN20 SAB 20 M 12 T 330-A				
42		**103890**	E103889		3	pcs
		PRESSURE GAUGE SIZE 100/0-400 BAR 213.40.100 WITH TRIANGULAR BEZEL AND MOUTING BRACKET CENTRE BACK CONNECTION				
46		**104218**	E104215		2	pcs
		BALL VALVE DN20 M36X2 100 015				
47		**104216**	E104215		1	pcs
		BALL VALVE DN12 M24X1,5 100 013				
49	P	**107146**			1	pcs
		ELECTRICAL CONTROL CENTRAL HYDRAULIC UNIT TYPE EST-A02				
50		**104238**	E104237		1	pcs
		BALL VALVE DN32 R1 1/4" 101 507				

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emp.

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
58		**113424** OIL FILTER UNIT 1,5/1,7 kW 380/415V-50Cycl., 440/460V-60Cycl. OF5 S 10V 6N 1 C	E113433		1	pcs
59		**103881** FILTER ELEMENT SIZE 0330R BETA MICRON BN/HC 10 MICRON 0330 R 010 BN/HC/-V	E103868		1	pcs
64		**104264** HEAT EXCHANGER D/L=63/630mm WE063G3C-063-11-36	E104263		1	pcs
70		**103981** GATE VALVE DN 15-1/2" AHA 60 NO.51 060-015	E103905		1	pcs
71		**103896** STRAINER R1/2" 1N R1/2" PN16 (BRASS)	E103971		1	pcs
72		**104208** 2/2-WAY DIRECTIONAL CONTROL VALVE 1/2" SOLENOID OPERATED 322 H 7506 24VDC-484270/481000	E104207		1	pcs
73		**103135** CONTROL VALVE-TEMPERATURE CONTROLLED R1/2" TEMP. RANGE 25°-65°C AVTA 15 003N2162	E104235		1	pcs
74		**104236** BULB POCKET R 3/4" 003N0050	E104235		1	pcs
80		**109842** SUPPORT CONSOLE WITH RUBBER KBK 222/G			1	pcs
81		**109841** CLAMP HSS 222/229			1	pcs
82		**108078** PLATE "STOPINC" 482x88mm			1	pcs
83		**107993** TYPE LABEL 120x100mm			1	pcs

End of list

3n2-770-35-45 emp 4

ITEM 22

B3.3 : >180 bar NOTSPEICHERDRUCK - BEREIT
EMERG. ACCU. PRESSURE - READY

B3.4 : <135 bar SYSTEMDRUCK - ZU TIEF
SYSTEM PRESSURE - TOO LOW

B3.5 : <160 bar SYSTEMDRUCK (grün) - TIEF
SYSTEM PRESSURE (green) - LOW

B3.6 : >180 bar SYSTEMDRUCK (rot) - BEREIT
SYSTEM PRESSURE (red) - READY

HYDRAULIK ANSCHLÜSSE: HYDRAULIC CONNECTIONS:

PE (R 1"):	SYSTEMDRUCK-EINGANG SYSTEM PRESSURE INLET
PA (R 1"):	SYSTEMDRUCK-AUSGANG SYSTEM PRESSURE OUTLET
PN (R 1"):	NOTSPEICHERDRUCK EMERGENCY ACCUMULATOR PRESSURE
T (R 1"):	RUECKLAUF DRAIN
TN (R 3/8"):	RUECKLAUF-NOTSPEICHER DRAIN EMERGENCY ACCUMULATOR
MP / SP:	SYSTEMDRUCK SYSTEM PRESSURE
NP / M:	NOTSPEICHERDRUCK EMERGENCY ACCUMULATOR PRESSURE

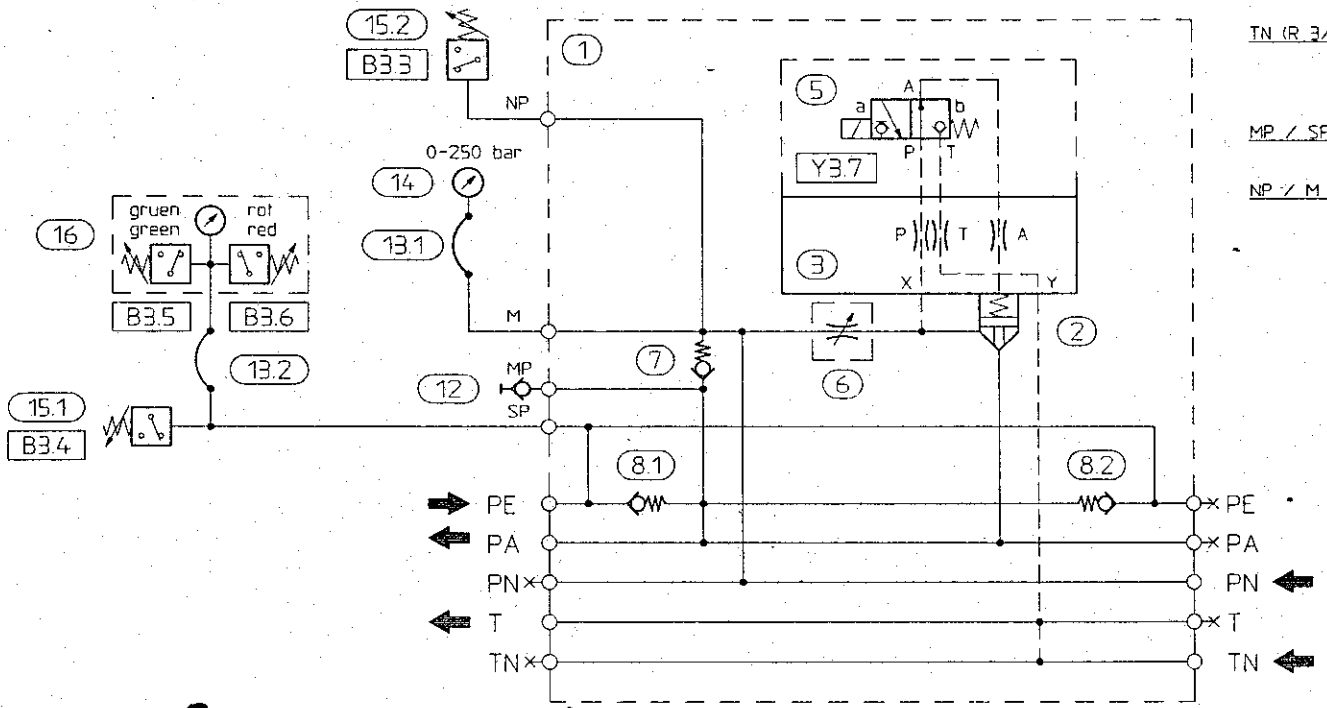

Схема гидравлическая принципиальная гидроагрегата TSG/VTB-100-G24 (поз.22) (к черт. Эп2-770-35-46)

Эп2-770-35-47

ROKOP
PITTSBURGH, PENNSYLVANIA, USA

VERTEILERBLOCK
CONNECTION MANIFOLD
TSG/VTB-100-G24
HYDRAULIC FLOW DIAGRAM

DATE	8394
DRAWN	Sr
CHECKED	Sr
SCALE	

UNIT NO.
PROJECT NO. 2014/419
CUSTOMER CIS RUSSLAND
VIA ROKOP, USA

B116764	ASSEMBLY
104285	PARTS LIST

REFERENCE | RE. | DATE | NAME

INTERSTOP® Stopinc Aktiengesellschaft CH-6341 BAAR

ORIGIN D107987

MICRO | FORMAT D | NO 116765 | SHEET OF | INDEX

REPL. FOR | REPL. BY

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 312864, Telex 862128 ist ch

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Спецификация оборудования гидроагрегата типа TSG/VTB-100-G24

Order Parts List

CONNECTION MANIFOLD
TYPE TSG/VTB-100-G24

Part no.: 104285 Project no. 2014/419 Page : 1
Dwg no. : ROKOP Print : 12/06/95
kg/piece: Issue : 12/06/95
Doc no. : 8141

3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit

Item no.	: 22
Assembly drawing	: B116764
Hydraulik flow diagram	: D116765
General hydr. flow diagram	: B116766
Electrical diagram	: E106369

Standard Farbanstrich : RAL 7023

1	101290 BASE BLOCK VTB 100 130x145x200	B101290		1 pcs
2	104233 2-WAY VALVE DIRECTIONAL CONTROL VALVE CARTRIDGE SIZE 16 LC16A20E6X/V	E104230		1 pcs
3	104232 2-WAY VALVE DIRECTIONAL CONTROL VALVE COVER SIZE 16 LFA16WEA6X/V	E104230		1 pcs
5	104283 3/2-WAY DIRECTIONAL CONTROL VALVE SIZE 6 SOLENOID OPERATED 24VDC M-3SEW6U2X/420LG24NZ4/V	E103843		1 pcs
6	103904 THROTTEL VALVE-CARTRIDGE SIZE 16 DVE-16-1.1/0-V	E103902		1 pcs
7	103839 CHECK VALVE-CARTRIDGE G1/2A RK 3 VITON	E103836		1 pcs
8	103840 CHECK VALVE-CARTRIDGE RB 3 VITON	E103836		2 pcs

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Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
12		**104100** MINIMESS CONNECTION MALE STUD PRESSURE GAUGE CONNECTOR R1/2" EMA 3/R1/2"	E104099		1	pcs
13		**104096** MINIMESS HIGH PRESSURE HOSE DN2 L=800 mm S100-AC-AC-0080	E104072		2	pcs
14		**104284** PRESSURE GAUGE SIZE 63/0-250 BAR 213.40.063 WITH TRIANGULAR BEZEL AND MOUTING BRACKET CENTRE BACK CONNECTION	E103889		1	pcs
15		**103845** PRESSURE SWITCH 0-250 BAR DV7.250.33025	E103845		2	pcs
16		**103844** PRESSURE SWITCH WITH GAUGE 0-250 BAR DV7.250.29025	E103844		1	pcs
17		**104094** MINIMESS CONNECTION MALE STUD PRESSURE GAUGE CONNECTOR G1/4" 2103-02-51.00	E104072		1	pcs
18		**104292** MINIMESS CONNECTION PRESSURE GAUGE CONNECTOR M14x1,5 2103-41-06.10	E104072		1	pcs
19		**104073** MINIMESS CONNECTION BULKHEAD PRESSURE GAUGE CONNECTOR G1/2" 2103-05-02.00	E104072		1	pcs
20		**104209** MINIMESS CONNECTION BULKHEAD PRESSURE GAUGE CONNECTOR G1/4" 2103-05-01.00	E104072		1	pcs
21		**104234** SAE SCREW-IN FLANGE R1" AFS 102 G	E104286		8	pcs
22		**104293** ADJUSTABLE BARREL TEE FITTING EVL 6-PSR			1	pcs
23		**104294** STRAIGHT STUD STANDPIPE EVGE 6-PSR-ED VI			2	pcs

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INTERSTOP

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
24		104296 STRAIGHT MALE STUD FITTING GE 6-PSR-ED VI			1	pcs
25		100442 BASE RAIL VTB100 30x15x500	HY-100442.3		2	pcs
26		108787 PROTECTION HOOD VTB-100 500x283x460	B108787		1	pcs
27		106444 SUPPORT PLATE VTB-100	E106444		1	pcs
28		102081 HEXAGON HEAD SCREW M8X16 DIN 933-8.8			4	pcs
29		102161 HEXAGON SOCKET HEAD CAP SCREW M8X16 DIN 912-8.8			4	pcs
30		102177 HEXAGON SOCKET HEAD CAP SCREW M10X35 DIN 912-8.8			32	pcs
31		102303 SPRING LOCK WASHER 8 DIN 7980 SPRING STEEL			8	pcs
32		102304 SPRING LOCK WASHER 10 DIN 7980 SPRING STEEL			32	pcs
33		102776 HEXAGON SOCKET HEAD CAP SCREW M5X10 DIN 912-8.8			4	pcs
34		106456 HEXAGON SOCKET COUNTERSUNK HEAD SCREW M4X10 DIN 7991-10.9			2	pcs
35		104411 STRAIGHT MALE STUD FITTING GE 25-PSR-ED VI			5	pcs
36		107649 WELD NIPPLE SKA 25x3 VI			5	pcs
37		104413 STRAIGHT MALE STUD FITTING GE 12-PSR-ED VI			1	pcs
38		107554			1	pcs

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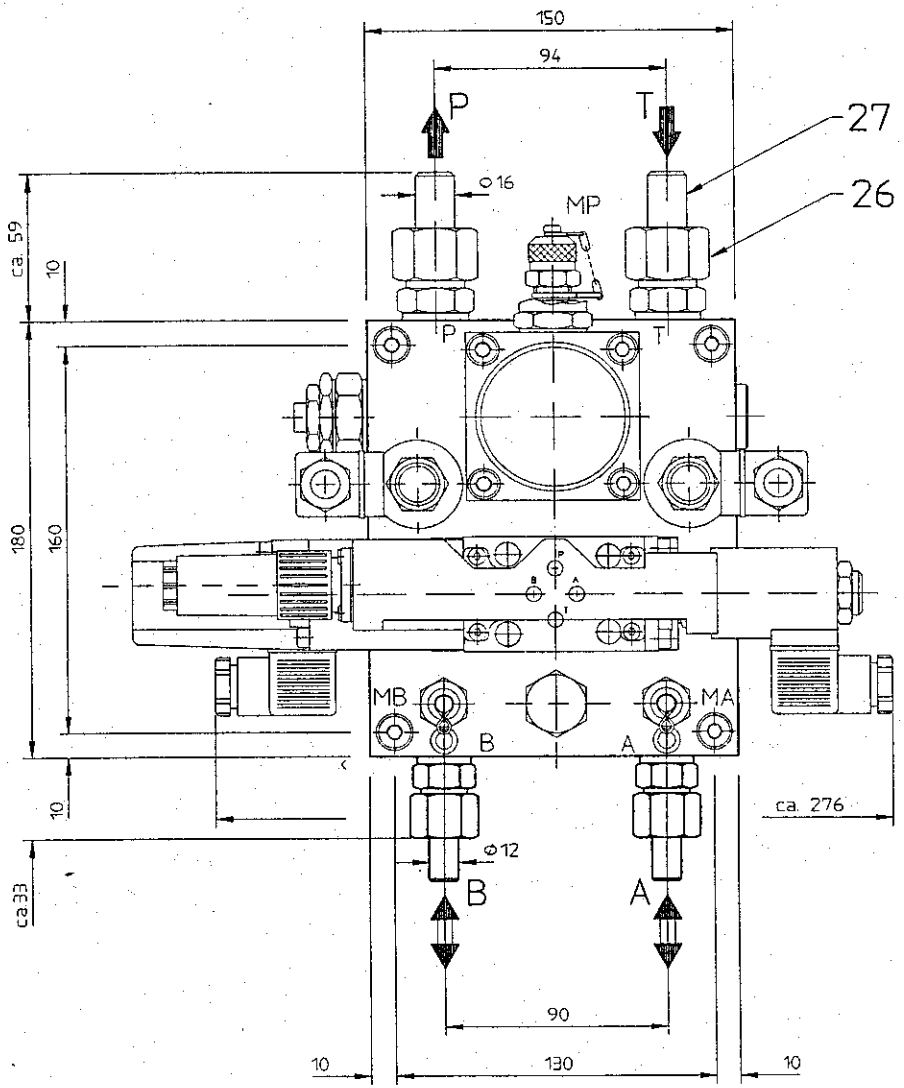
INTERSTOP

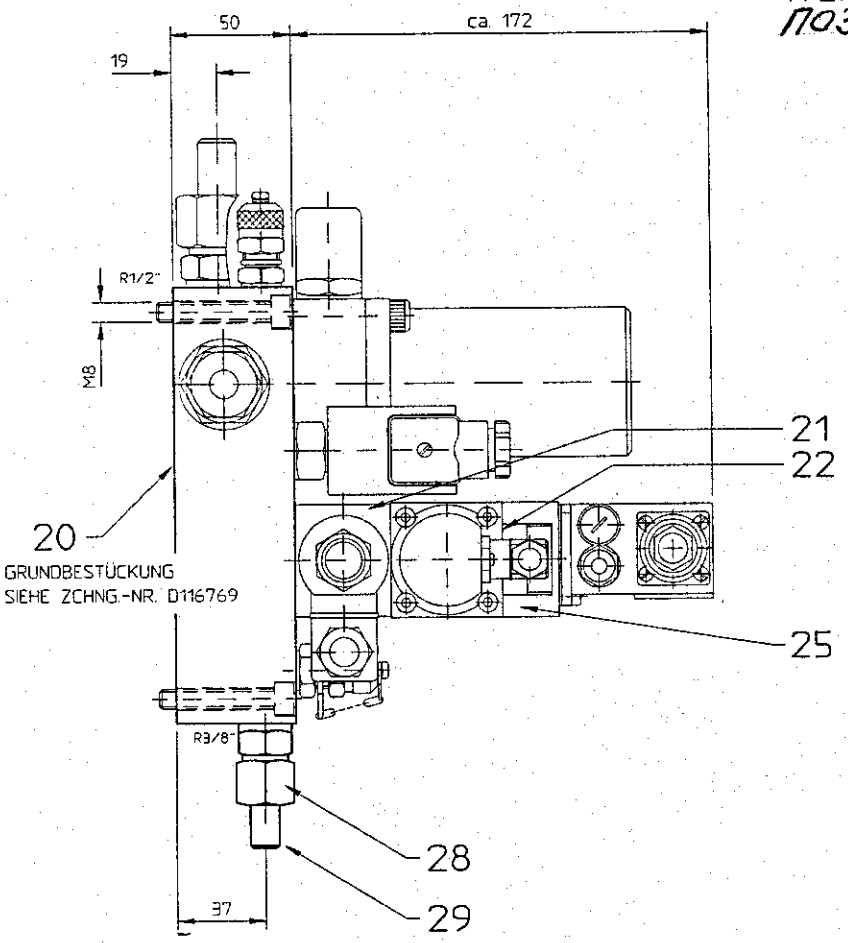
Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
		WELD NIPPLE SKA 12x1,5 VI				
39		104287 LOCKING SCREW VSTI R1-ED VI			3	pcs
40		102809 LOCKING SCREW VSTI R3/8-ED VI			1	pcs
50	P	106370 TERMINAL BOX CONNECTION MANIFOLD TYPE KK-VTB 100			1	pcs

End of list

3n2-770-35-48- cmp 4

ITEM 21
поз. 21





Эп 2-770-35-49

Гидроагрегат типа TS/S2-1,0 (поз.21)

				DATE	6.3.95
				DRAWN	Sr
				CHECKED	Sr
				SCALE	12
D116768	HYDRAULIC FLOW DIAGRAM				
109830	PARTS LIST (DOC.NO 8143)	A			
REFERENCE		REV	DATE	NAME	ORIGIN : D112001A

UNIT NO.:
PROJECT NO: 2014/419
CUSTOMER: OIS. RUSSLAND
VIA ROKOP, USA

INTERSTOP® Stopinc Aktiengesellschaft CH-6341 BAAR

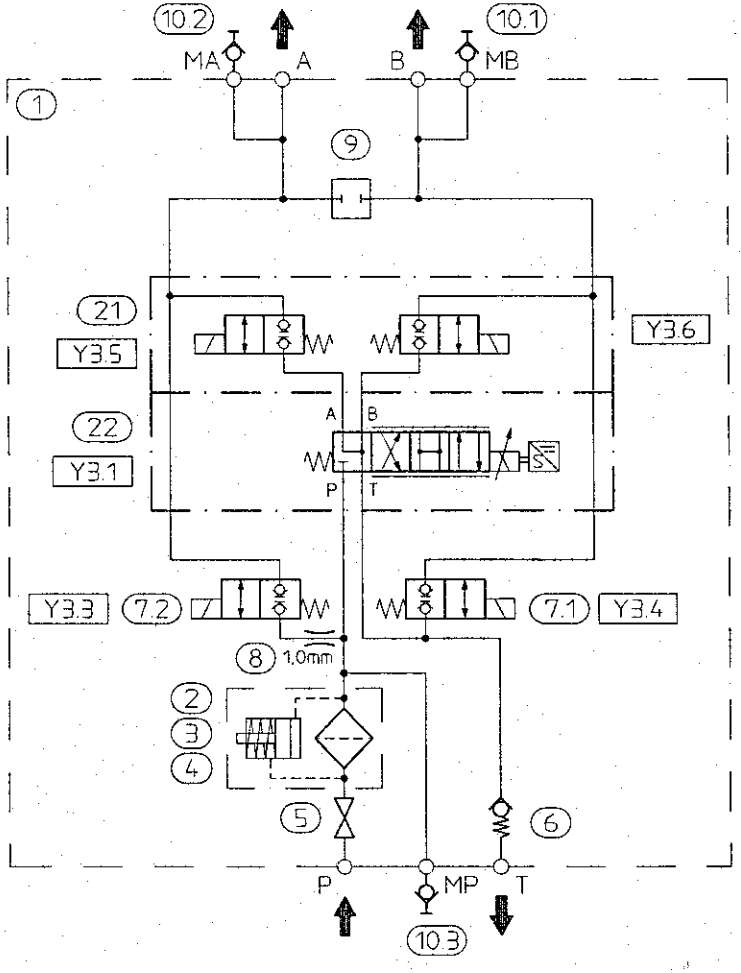
ROKOP
PITTSBURGH, PENNSYLVANIA, USA

STEUERBLOCK
CONTROL UNIT
TS/S2-1,0
ASSEMBLY DRAWING

MICRO	FORMAT	NO	SHEET	INDEX
	D	116767	OF	

REPL. FOR | REPL. BY

ITEM 21
Блок 21



HYDRAULIK ANSCHLÜSSE : HYDRAULIC CONNECTIONS

A : TUNDISH-SCHIEBER SCHLIESSEN
CLOSE TUNDISH GATE

B : TUNDISH-SCHIEBER ÖFFNEN
OPEN TUNDISH GATE

P : SYSTEMDRUCK
SYSTEM PRESSURE

T : RÜCKLAUF
DRAIN

ALLE MESSANSCHLUESSE MIT GEWINDE M16x2
ALL PRESSURE TEST POINTS - THREAD M16x2

VENTIL FUNKTIONEN : FUNKTIONS OF CONTROL VALVES :

22 PROPORTIONAL WEGEVENTIL - SCHIEBER ÖFFNEN/SCHLIESSEN
PROPORTIONAL CONTROL VALVE - LADLE GATE OPEN/CLOSE

21 ABSPERRVENTIL A/B LEITUNG
SHUT-OFF CONTROL VALVE

7 NOTSCHLIESS-VENTILE
EMERGENCY-SHUT CONTROL VALVE

Эл2-770-35-50

Схема гидравлич. принципиальная гидроагрегата типа TS/S2-10

				DATE	8.3.95
				DRAWN	Sr
				CHECKED	Sr
				SCALE	/

UNIT NO.:
PROJECT NO.: 2014/419
CUSTOMER: ROKOP, USA

D116767	ASSEMBLY			
109880	PARTS LIST	A		
REFERENCE		REV	DATE	NAME

INTERSTOP® Stopinc Aktiengesellschaft CH-6341 BAAR

ORIGIN D109988A

ROKOP PITTSBURGH, PENNSYLVANIA, USA

MULTIFUNKTIONS-VENTILBLOCK
VALVE MANIFOLD
TS/S2-10
HYDRAULIC FLOW DIAGRAM

MICRO	FORMAT	NO	SHEET	INDEX
	D	116768	OF	

REPL. FOR REPL. BY

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INTERSTOP

Спецификация оборудования
Order Parts List
гидроагрегата типа TS/S2-1,0
CONTROL UNIT TYPE TS/S2-1.0

Part no.: 109830 Project no. 2014/419 Page : 1
Dwg no. : ROKOP Print : 09/06/95
kg/piece: 12 Issue : 22/05/95
Doc no. : 8143

3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit

Item no.	: 21
Assembly drawing	: D116767
Hydraulik flow diagram	: D116768
General hydr. flow diagram	: B116766
Electrical diagram	: E116696

20	P	**109900** CONTROL UNIT TYPE S2-... BASIC ASSEMBLY			1 pcs
21		**108685** 2/2-WAY DIRECTIONAL SEAT VALVE SIZE 6 24VDC SANDWICH PLATE VV6AB-31/31-OC-V	E109664		1 pcs
22		**112778** 4/3-WAY PROPORTIONAL VALVE WITH INTERGRATED AMPLIFIER KASDGAV-3-96L-12M F PD7-H7-10			1 pcs
25		**115863** HEXAGON SOCKET HEAD CAP SCREW M5X75 DIN 912-12.9			4 pcs
26		**104302** STRAIGHT MALE STUD FITTING GE 16-PSR-ED VI			2 pcs
27		**107555** WELD NIPPLE SKA 16x2 VI			2 pcs
28		**112794** STRAIGHT MALE STUD FITTING GE 12-PSR-ED			2 pcs
29		**107554** WELD NIPPLE SKA 12x1,5 VI			2 pcs

End of list

Эп2-770-35-5[illegible] стр1 всего 1

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INTERSTOP

Спецификация оборудования

Order Parts List

CONTROL UNIT TYPE S2-...
BASIC ASSEMBLY

Part no.: 109900 Project no. 2014/419
Dwg no. : ROKOP
kg/piece: 7.21

Page : 1
Print : 09/06/95
Issue : 05/04/95
Doc no. : 8144

3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
		Item No. / Assembly Drawing	21 / D116769			
1		**109950** BASE BLOCK (S2) 180x150x50 9.3-1.013			1	pcs
2		**109951** PRESSURE FILTER SIZE 60 9.3-2.002 WITHOUT FILTER ELEMENT			1	pcs
3		**103094** FILTER ELEMENT SIZE 0060D BETA MICRON BH/HC 10 MICRON 0060 D 010 BH/HC/-V	E103868		1	pcs
4		**109952** FILTER-CLOGGING INDICATOR VM5B.1-V			1	pcs
5		**109954** THROTTLE/SHUTT-OF VALVE CARTRIGE ST-C OD.21.01-03-04 (VITON)			1	pcs
6		**109953** CHECK VALVE VU-LN OD.44.02.00-03-01 (VITON)			1	pcs
7		**109909** 2/2-WAY DIRECTIONAL SEAT VALVE CARTRIDGE VEI-DT-06-1 24VDC OD.15-31-56.05-OC	E109666		2	pcs
8		**109955** ORIFICE G1/8"-1mm (L=10mm)			1	pcs
9		**109967** PLUG FOR EDIT VALVES OC.80.01-013			1	pcs

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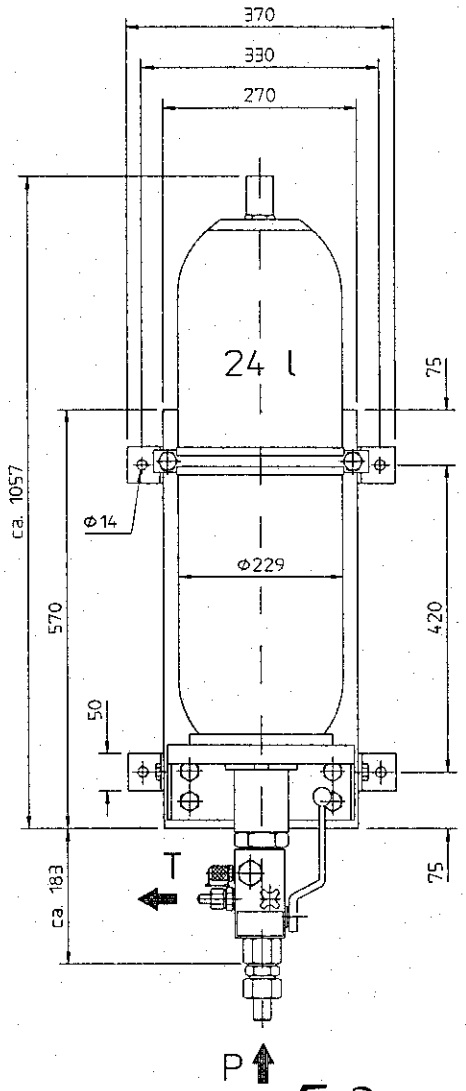
Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
10		103096 MINIMESS CONNECTION MALE STUD PRESSURE GAUGE CONNECTOR G1/4" 2103-01-18.10	E104072		3	pcs
11		109960 LOCKING SCREW 15-34/R1/2" VITON			1	pcs
12		109977 HEXAGON SOCKET HEAD CAP SCREW M8X55 DIN 912-8.8			4	pcs
13		102167 HEXAGON SOCKET HEAD CAP SCREW M8X50 DIN 912-8.8			4	pcs

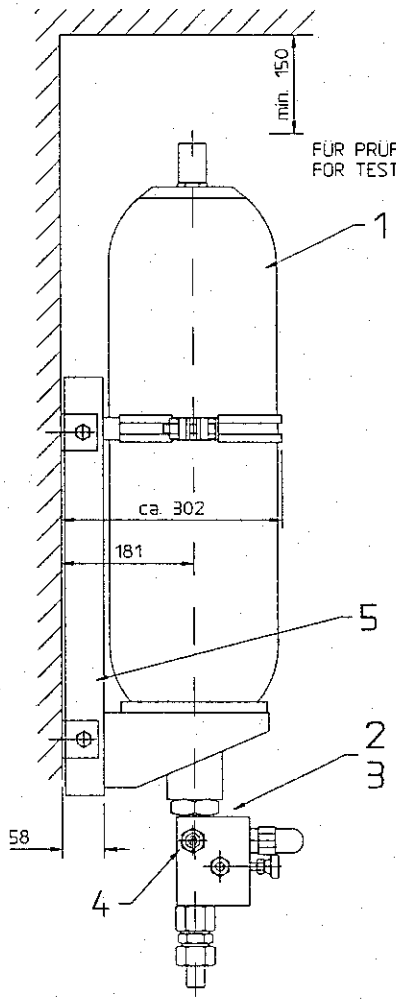
End of list

3n2-770-35-52 cmp 2

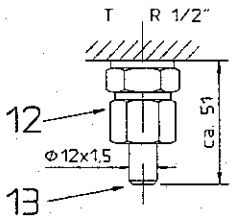
FUER DEN TRANSPORT IST DER DRUCKSPEICHER MIT 10 bar VORGESPANNT.
BEI DER INBETRIEBNAHME IST DER GASFUEHLDRUCK AUF DEN ERFORDERLICHEN DRUCK ZU ERHOEHEN.

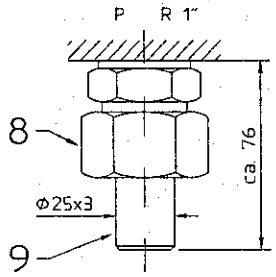
FOR A SAVE SHIPMENT THE ACCUMULATER GAS PRE-CHARGE PRESSURE HAS BEEN REDUCED TO 10 bar. BEFORE COMMISSIONING THE UNIT IT IS MOST IMPORTANT TO RECHARGE THE ACCUMULATOR UP TO THE REQUIRED PRESSURE.



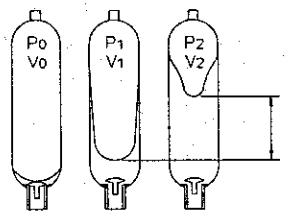


DETAIL DER ANSCHLUESSE
CONNECTION DETAILS





SPEICHERAUSLEGUNG ACCUMULATOR SIZING



P_2 =	MAX. BETRIEBSDRUCK MAX. WORKING PRESSURE	200 bar
P_1 =	MIN. BETRIEBSDRUCK MIN. WORKING PRESSURE	145 bar
P_0 =	GASFUELLDRUCK GAS PRE-CHARGE PRESSURE	120 bar
ΔV =	NUTZBARE FLUESSIGKEITSMENGE EFFECTIVE FLUID VOLUME	3,83 l
	NENNVOLUMEN NOM. VOLUME	24 l

Эл2-770-35-53

Гидроаккумулятор 24ℓ типа SP 24-H.1

				DATE	13.09.95
				DRAWN	SR
				CHECKED	SR
				SCALE	/
112713	PARTS LIST	A			
REFERENCE		REV	DATE	NAME	

UNIT NO.:
PROJECT NO.: 2014/419
CUSTOMER: ROKOP, USA

INTERSTOP® Stoping Aktiengesellschaft CH-6341 BAAR

ORIGIN -0112739

ROKOP PITTSBURGH, PENNSYLVANIA, USA

NOTSPEICHER MIT SICHERHEITSBLOCK
EMERGENCY ACCUMULATOR WITH SAFTY BLOCK
24 l TYP SP 24-H.1
ZUSAMMENSTELLUNG/ASSEMBLY

MICRO	FORMAT	NO	SHEET	INDEX
	D	116770	OF	

REPL FOR REPL BY

Stopinc Aktiengesellschaft
ugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 31 28 64, Telex 862 128 ist ch

INTERSTOP

Спецификация к черт. гидроаккумулятора

Order Parts List

EMERGENCY ACCUMULATOR 24L TYPE SP 24-H.1
WITH SAFETY AND SHUT-OFF BLOCK
MOUNTED WITH SUPPORTING SET

rt no.: 112713 Project no. 2014/419
g no. : ROKOP
/piece:

Page : 1
Print : 09/06/95
Issue : 13/03/95
Doc no. : 8147

0-018.FOE

s.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit

Item No.	120
Assembly Drawing	D116770

Standard Farbantrich : RAL 7023

1		**108797** E112730 ACCUMULATOR 24L NBR (PERBUNAN) BLADDER SB330-24A1/112-A-330A		1 pcs
2		**112752** SAFETY AND SHUT-OFF BLOCK DN20 SAB 20 M 12 T 330-A		1 pcs
3		**112753** ADAPTOR S 13		1 pcs
4		**103096** E104072 MINIMESS CONNECTION MALE STUD PRESSURE GAUGE CONNECTOR G1/4" 2103-01-18.10		1 pcs
5		**112749** SUPPORTING SET 20,24L SEB 20		1 pcs
8		**104411** STRAIGHT MALE STUD FITTING GE 25-PSR-ED VI		1 pcs
9		**107649** WELD NIPPLE SKA 25x3 VI		1 pcs
12		**104304** STRAIGHT MALE STUD FITTING GE 12-PS/R1/2-ED VI		1 pcs
13		**107554** WELD NIPPLE SKA 12x1,5 VI		1 pcs

Эл2-770-35-54 стр 1, всего 1

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INTERSTOP

Customer : Red October via Rokop
Project No.: 2014/419

4. Gas Control Equipment

4.1	Functional Description	функциональное описание
4.2	Gas Control Box	Ящик контроля газа
4.3	Flow Diagram	Диаграмма (схема) потока
4.4	Hose Set	Шланг течения

Эп.2-770-35-55

Content

SN = Submerged Nozzle

3n2-770-35-56
cmp1, 6ce20-9

1.1 General specifictions

Unit No.	:	AR-3160 to 3165
Type	:	AR 13-2.0
Number of gas boxes	:	6
Gate type	:	13 QC

References	:	Assembly drawing	:	C116771
	:	Gas flow diagram	:	C116772
	:	Electrical diagram	:	E106988
	:	Hose set assembly	:	D116773
	:	Gas box parts list	:	116810 (Doc.no. 8258)
	:	Hose set parts list	:	105630 (Doc.no. 8841)
	:	Electrical parts list	:	106989 (Doc.no. 8259)

Technical Datas

Gas box dimension	:	600x600x250 mm (width x height x depth)
Weight	:	45 kg
Gas supply medium	:	ARGON
Gas supply pressure	:	min. 7 bar / max. 16 bar
Gas system pressure	:	5 bar (Flowmeter calibrated with 6 bar abs.)
Electrical supply	:	24 VDC (Controlled by PLC)
Gas supply connection	:	Weld nipple ø20x2,5
El. supply connetion	:	Blank plate to be drilled on site
Outlets per strand	:	3 (Nozzle, SN Change, SN Joint) Weld nipple ø12x1,5

Flowmeter range scale:	Nozzle	0,8-8	(2-6)	Nl/min at 6bar abs.
	SN Change	5-50	(25-28)	Nl/min at 6bar abs.
	SN Joint	5-50	(5-10)	Nl/min at 6bar abs.

Note: Datas in bracket are for normal approx. consumption.

In 2-770-35-56
cmp 2

1.2 Functional characteristic of the gas box

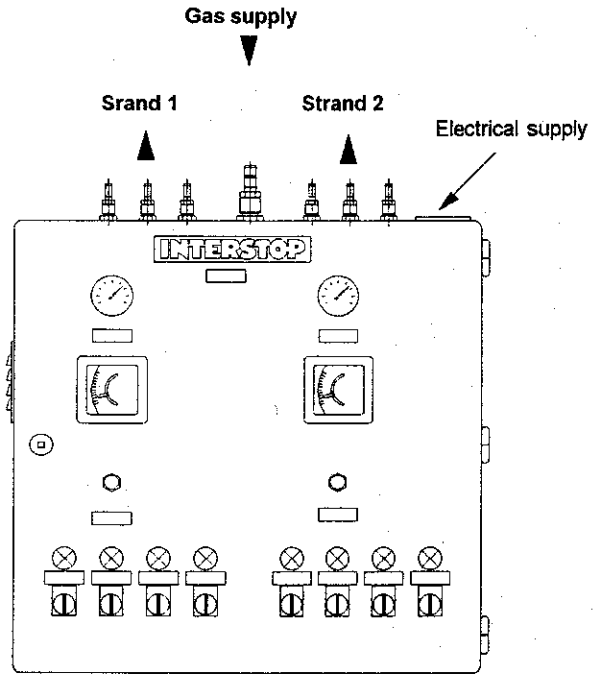
The gas control box guarantees a controlled supply of all necessary gas quantities for casting with the tundish gate type 13 QC.

For each tundish gate 3 gas supply lines are provided :

NOZZLE : Continuous, optimally adjusted gas flow through the purging nozzle during casting process.
Anti-Clogging: Pulse-wise injection of gas into purging nozzle in order to prevent a clogging in the pouring channel.

SN CHANGE : Injection of the required gas flow quantity through the purging plug.

SN JOINT : Continuous gas flow into the joint between the tundish gate and the submerged nozzle.



3n2-770-35-56 Emp 3

1.2.1 Pressure control and filtration

All control equipments for the pressure and filtration are inside the gas box.

To remove contamination (occured during installation) from the supply lines the prefiltered gas (supplied by customer) passes through a filter element which is built into the pressure regulator/filter unit (2).

It is possible to shut-of the gas system with the hand valve (1.1). The pressure gauge (4) indicates the gas supply pressure and should be min. 7 bar.

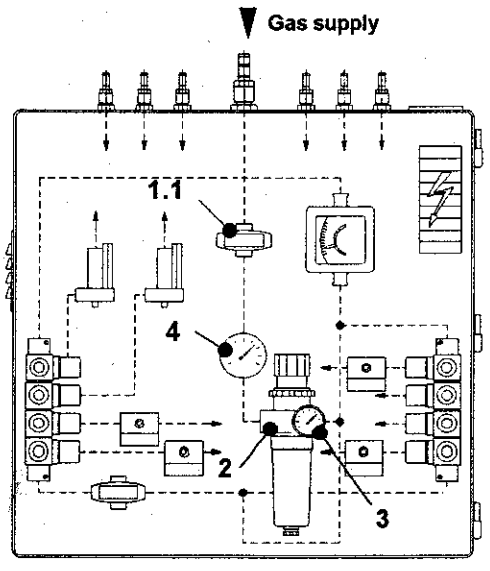
The pressure regulator/filter unit (2) reduces and stabilizes the gas pressure to the required working pressure of 5 bar (flowmeter calibrated 6 bar abs.) indicated on the pressure gaug.: (3).

1.2.2 Gas flow measuring and controlling

The gas flow quantity is measured and indicated on corresponding flowmeters (Scale in Nl/min at 6 bar abs.).

The fine regulation of the required gas flow quantity for the casting process is possible with the fine regulation throttle valve. The aquire built-up back pressure rate of the output of the gas control box is indicated on the corresponding pressure gauge(only for nozzle).

Each gas line is switched ON/OFF by solenoid valves. In automatic mode the selection switches are in position "AUTO" and all solenoid valves are controlled by the PLC. At any time the solenoid valves can be operated manually by turning the selection switches into position "MAN" located on the front door.



Inside view
2-Strand Gas control box

In2-170-35-56 cmp 4

1.3 Gas flow adjustment and set-up

Connect the gas supply line to the gas box before starting with the adjustments and set-ups.

Each gas lines is switched ON/OFF by solenoid valves. In automatic mode the selection switches are in position "AUTO" an all solenoid valves are controlled by PLC. For adjustement the solenoid valve can be operated manually by turning the selection switches into position "MAN" located on the front door.

The following set-up values are pre-settings and have to be optimized during commissioning and casting prozedure.

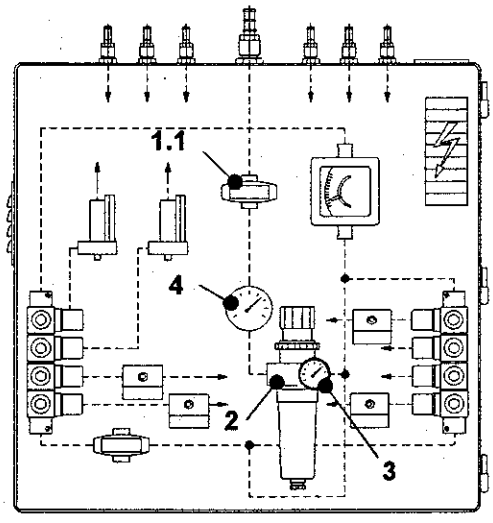
1.3.1 System pressure adjustment

The pressure regulator/filter unit (2) must be pressureless by turning the adjustable button.

Open the main gas supply line by opening the ball valve (1.1). The pressure gauge (4) shows the actual gas supply pressure (Primary pressure) and should indicate min. 7 bar.

The system pressure (secundary pressure) is set-up by turning the adjustable button from the pressure regulator unit (2) until the gas pressure reaches approx. 5,2 bar, shown on the pressure gauge (3).

The system pressure (secundary pressure) can be released by opening the drain knob on the bottom of the pressure regulator/filter unit (2).



Inside view
2-Strand Gas control box

3n2-770-35-56 cmp 5

1.3.2 "NOZZLE" line adjustment (2-Strand box)

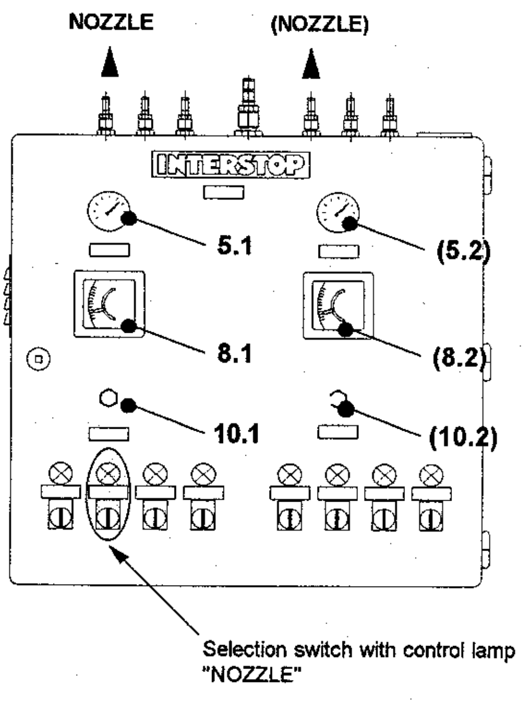
Each selection switches must be in position "0".

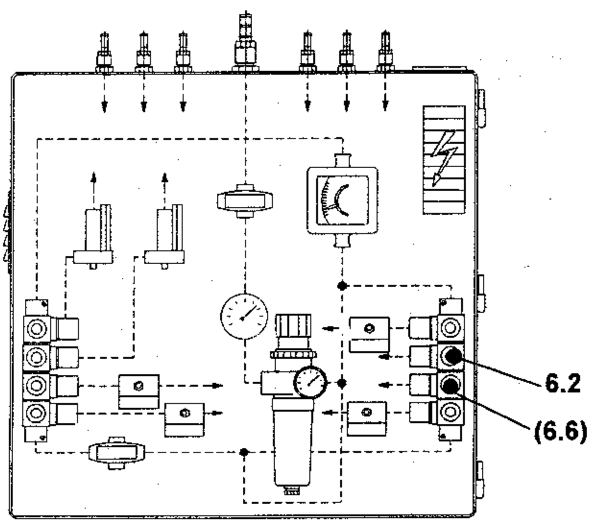
Switch the selection switch "NOZZLE" to position "MAN", the green control lamp "NOZZLE" lights.

Open the throttle valve on the differential pressure regulator (10.1 or 10.2) until the gas flow reaches the required quantity (approx. 5 Nl/min), shown on the flowmeter (8.1 or 8.2). The gas back pressure is shown on the pressure gauge (5.1 or 5.2).

The gas flows to the outlet "NOZZLE". Solenoid valve (6.2 or 6.6) is active.

Switch the selection switch back to position "0".





Зп 2- 770-35-56 стр 6

1.3.3 "NOZZLE" line with " ANTI-CLOGGING" adjustment (2-Strand box)

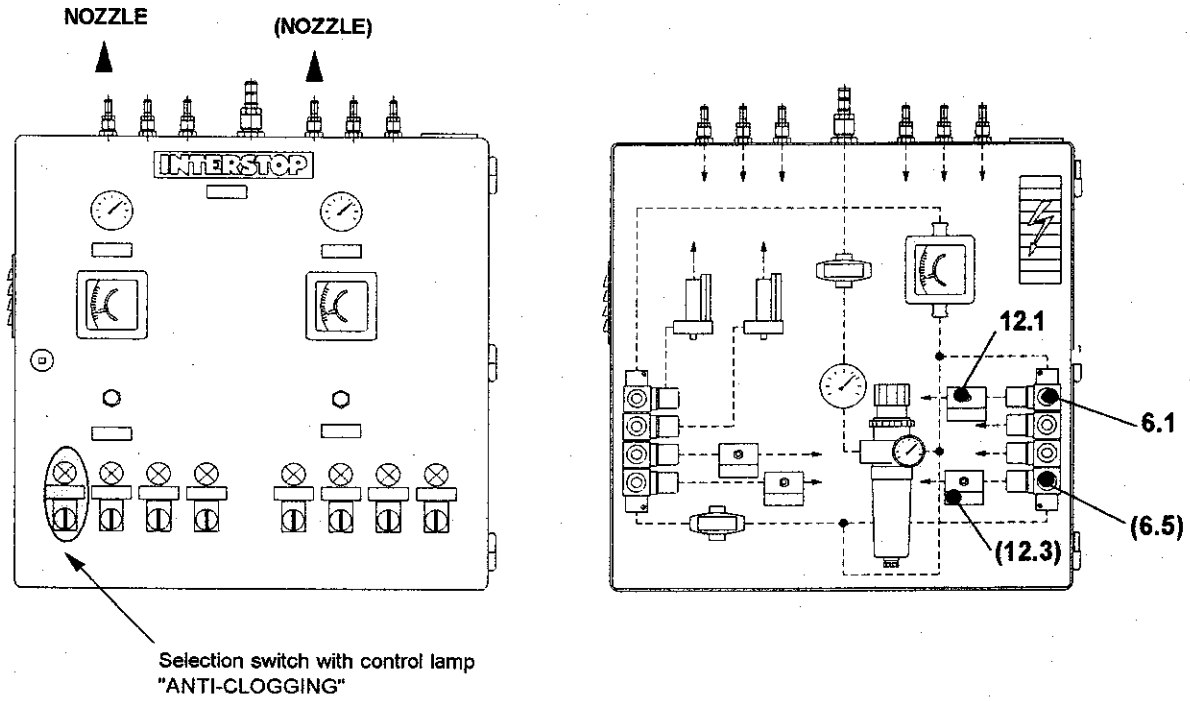
Each selection switches must be in position "0".

Turn and hold selection switch "ANTI-CLOGGING" in position "MAN", the green control lamp "ANTI-CLOGGING" lights.

Open the throttle valve (12.1 or 12.3) for the required gas flow (approx. 1/3 turn). The gas flow quantity is not indicated on the flowmeter.

The gas flows to the outlet "NOZZLE". Solenoid valve (6.1 or 6.5) is active.

When releasing the switch it goes automatically into position "0" and the control lamp switches off.



In2-770-35-56 cmp 7

1.3.4 "SN CHANGE" line adjustment (2-Strand box)

All selection switches must be in position "0".

Switch the selection switch "SN CHANGE" to position "MAN", the green control lamp "SN CHANGE" lights.

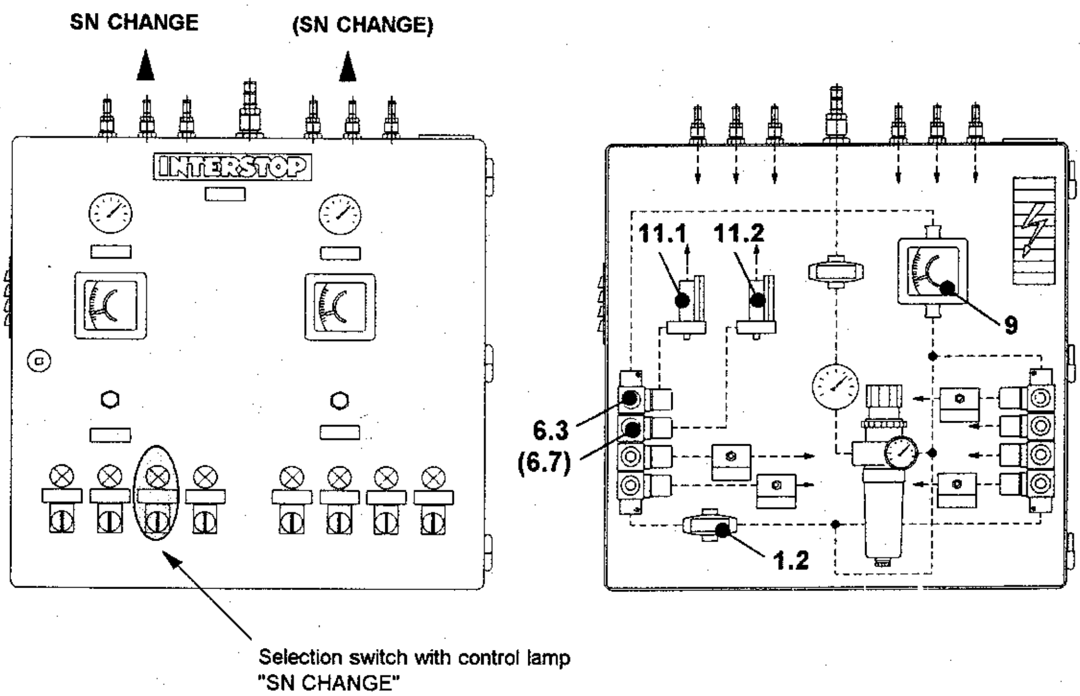
Close the by-pass valve (1.2) for calibration of the flowmeter (9).

Open the throttle valve on the differential pressure regulator (11.1 or 11.2) until the gas flow reaches the required quantity (approx. 25 Nl/min), shown on the flowmeter (9).

The gas flows to the outlet "SN CHANGE". Solenoid valve (6.3 or 6.7) is active.

Open the by-pass valve (1.2). (Handle in pipe direction)

Switch the selection switch back to position "0".



1.3.5 "SN JOINT" line adjustment (2-Strand box)

All selection switches must be in position "0".

Switch the selection switch "SN JOINT" to position "MAN", the green control lamp "SN JOINT" lights.

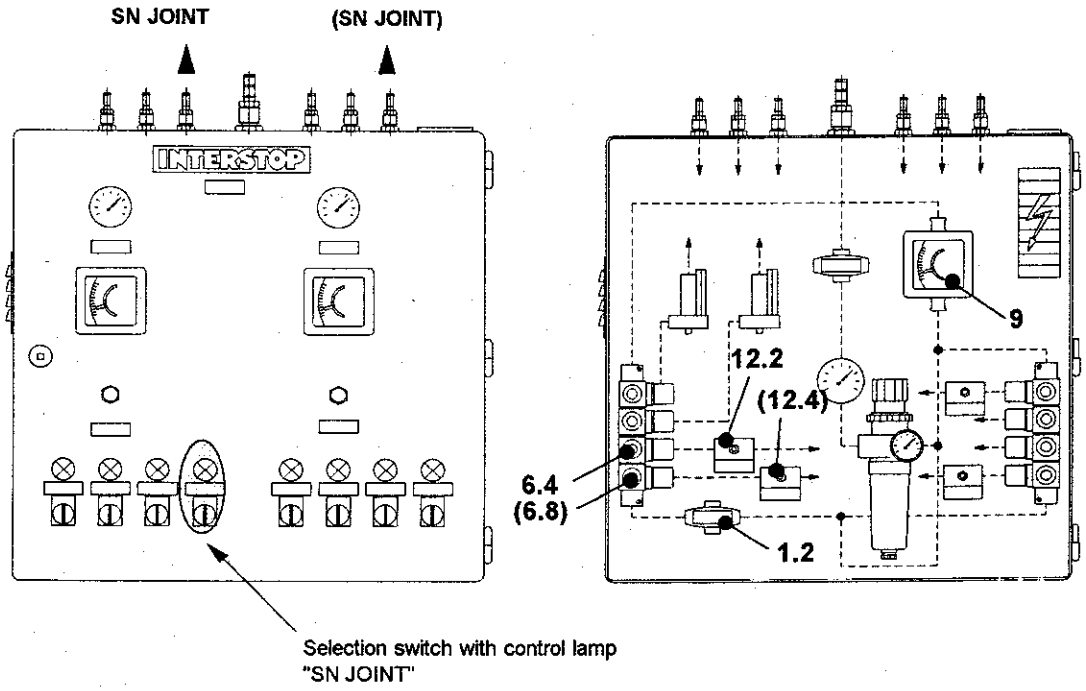
Close the by-pass valve (1.2) for calibration of the flowmeter (9).

Open the throttle valve (12.2 or 12.4) until the gas flow reaches the required quantity (approx. 6 Nl/min), shown on the flowmeter (9).

The gas flows to the outlet "SN JOINT". Solenoid valve (6.4 or 6.8) is active

Open the by-pass valve (1.2).(Handle in pipe direction)

Switch the selection switch back to position "0".



3n2-770-35-56 cmp 9

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 31 28 64, Telex 862128 ist ch

INTERSTOP

Спецификация к черт.
Order Parts List
блока контроля типа AR13-2,0
GAS CONTROL BOX TYPE AR 13-2.0

Part no.:	105210	Project no. 2014/419	Page : 1
Dwg no. :		ROKOP	Print : 01/06/95
kg/piece:	45		Issue : 01/06/95
			Doc no. : 8258

3101-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit	Brand

Item no.	28
Unit no.	AR-3160 to 3165
Assembly drawing	C116771
Gas flow diagram	C116772
Electrical diagram	E106988

1	**105207** BALL VALVE R1/2" VC 8-PC-2H		2 pcs	NORGREN
2	**105208** FILTER/PRESSURE REGULATOR R1/2" 0,4-10 bar 25mic B11-496-M2MD		1 pcs	NORGREN
3	**109516** PRESSURE GAUGE SIZE 50 0-16 BAR 18-013-013		1 pcs	NORGREN
4	**105211** PRESSURE GAUGE SIZE 63 0-25 BAR 111.10.063 BACK CONNECTION G1/4"A		1 pcs	WIKA
5	**105212** PRESSURE GAUGE SIZE 63 -1/+5 BAR 111.10.063 WITH TRIANGULAR BEZEL AND MOUTING BRACKET CENTRE BACK CONNECTION		2 pcs	WIKA
6	**105213** 2/2-WAY DIRECTIONAL CONTROL VALVE SOLENOID OPERATED 24VDC E 121 F 4302/481865		8 pcs	LUCIFER
7	**105214** BASE PLATE WITH 4 CONNECTIONS 121 43/4S 51		2 pcs	LUCIFER
8	**105216** FLOWMETER 0,8-8 NL/MIN,6BAR ABS/ARGON KCI-T70/1/4" TUBE NO. KC6	E116752	2 pcs	ROTA

Эп2-770-35-59, лист 1, всего 3 л-та

Stopinc Aktiengesellschaft

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Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit	Brand
9		**105217** FLOWMETER 5-50 NL/MIN,6BAR ABS/ARGON KCI-T70/1/4" TUBE NO. KC 40	E116752		1	pcs	ROTA
10		**105232** PRESSURE REGULATOR 1/4"NPT WITH NEEDLE SIZE 6 8942-MS			2	pcs	BROOKS
11		**107229** PRESSURE REGULATOR 1/4"NPT WITH NEEDLE VALVE STD-MS SIZE 3 PANEL MOUNTED 8942-MS			2	pcs	BROOKS
12		**105218** THROTTLE VALVE G1/8" DV-06			4	pcs	HOERBIGER
13		**112335** NORMKASTEN 600x600x250 AR 13-2.0 BOHRBILD	C112335		1	pcs	
14		**105237** LOW PRESSURE HOSE DN6 ID/OD=7,5/13,5mm GCA 01.05050.0060		4	1.3	m	SILVERPRESS
19	P	**106989** ELECTRICAL CONTROL GAS-CONTROL-BOX TYPE EST-AR13-2			1	pcs	
20		**102845** PANEL UNION SO 1521-8			6	pcs	SERTO
21		**109523** FEMALE ADAPTER SO 30-1/4-3/8			6	pcs	SERTO
22		**112794** STRAIGHT MALE STUD FITTING GE 12-PSR-ED			6	pcs	ERMETO
23		**107554** WELD NIPPLE SKA 12x1,5 VI			6	pcs	ERMETO
24		**112336** PANEL UNION SO 1521-14			1	pcs	SERTO
25		**109524** FEMALE ADAPTER SO 30-1/2-3/4			1	pcs	SERTO
26		**104303** STRAIGHT MALE STUD FITTING			1	pcs	ERMETO

Jn2-770-35-59, sheet 2

Stopinc Aktiengesellschaft

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INTERSTOP

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit	Brand
		GE 20-PSR-ED VI					
27		**107556** WELD NIPPLE SKA 20x2,5 VI			1	pcs	ERMETO
28		**116884** WASHER FOR FEMALE THREAD SO 40005-10-3/8			6	pcs	SERTO
40		**108076** PLATE "STOPINC" 200x34mm			1	pcs	SERIGRAPHICA
41		**107993** TYPE LABEL 120x100mm			1	pcs	

End of list

Fn2-770-35-59, лист 3

Stopinc Aktiengesellschaft

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INTERSTOP

Order Parts List

HOSE SET AR 13
TO GAS CONTROL BOX

Part no.: 105630 Project no. 2014/419
Dwg no. : ROKOP
kg/piece:

Page : 1
Print : 01/06/95
Issue : 12/05/95
Doc no. : 8841

3101-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit	Brand
		Item No. / Assembly Drawing	29 / D116773				
1		**105628** SELF SEALING COUPLING DN6 SP-006-0-SL009-11-2-OV			2	pcs	WALTHER
2		**105629** THRU TYPE ADAPTOR DN6 SP-006-1-SL009-11			1	pcs	WALTHER
3		**105626** LOW PRESSURE HOSE 10/19mm TO SN214257/1/ISO 3821***TREG BEMERKUNG/NOTE : SCHLAUCHLAENGE BEI MONTAGE BESTIMMEN HOSE LENGHT TO BE DETERMINED IN FIELD		1	15	m	PIRELLI
4		**105627** HOSE CLAMP 63 HY-GEAR ART.174 103			6	pcs	MAAGTECHNIK
5		**102748** STRAIGHT BULKHEAD FITTING SV 12-PS			3	pcs	ERMETO
6		**107554** WELD NIPPLE SKA 12x1,5 VI			3	pcs	ERMETO
7		**109579** STRAIGHT STUD STANDPIPE EVGE 12-PSR-ED VI			3	pcs	ERMETO
8		**109576** FEMALE ADAPTER SO 30-3/8-1/4			3	pcs	SERTO
9		**109574**			3	pcs	LEGRIS

Эл 2-770-35-61 лист1 всего 2 л-тд

Stopinc Aktiengesellschaft

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INTERSTOP

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit	Brand
		MALE ADAPTER HOSE LINER 1/4"/10mm 0123 10 13					

End of list

3n2-770-35-61 Nucm2

Stopinc Aktiengesellschaft

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INTERSTOP

Customer : Red October via Rokop
Project No.: 2014/419

5. Hydraulic Cylinder

5.1 Hydraulic Cylinder MWS-80/80/E3/F5 (casting) (распределение, сбрасывание)

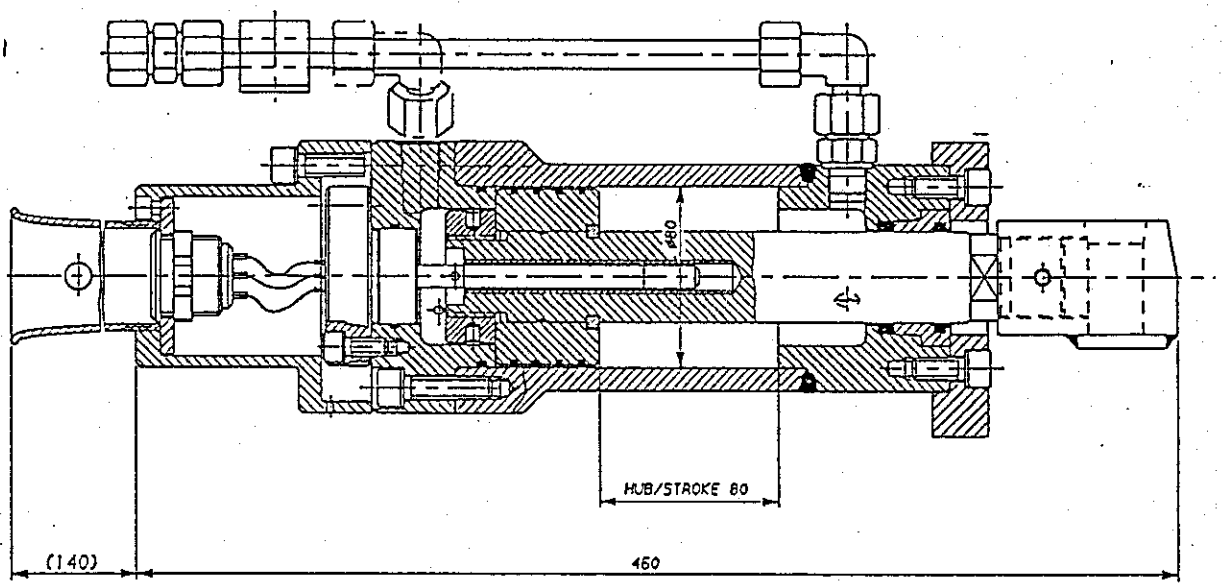
- Description Описание
- Drawing / Parts List Чертежи/перечень элементов

Hydraulic Cylinder S-80/80/R1/F5 (Test) see chapter 6 "Preparation Area"

Эл2-770-35-62

5.1 Hydraulic Cylinder with Integrated Stroke Measuring System MWS

Layout



Together with the proportional or servo valve the cylinder forms a unity for the position control loop. The cylinder contains all necessary requirements for a "servo cylinder".

- Minimum internal leakage
- Stick-slip-free, also in case of smallest movements
- A stable proper efficiency rate within the given application range

- Equipped with a stroke transducer which has a proper linearity and is free from temperature drifting

Эл2-770-35-63, стр.1, всего 6стр

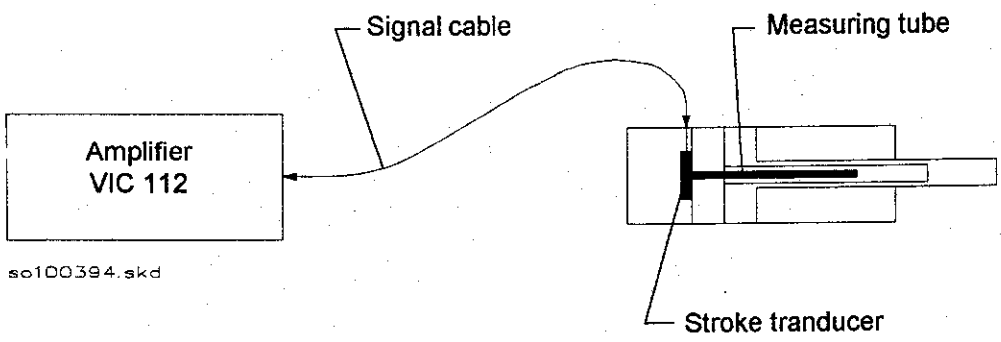
The measuring cylinder consists basically of the following parts:

- Head piece with casing, Item No. 1
- End piece with mech., hydr. and el. connections
- Bronce coated piston with maintenance free metal sealings, Item No. 4
- Piston rod hardened and chromium plated, Item No. 3
- Linear transducer with measuring tube, Item No. 19, completely encased, pressure and temperature stable
- Sealings in temperature- and fluid-resistant quality, easy to replace

Due to this modular design the cylinder can easy be checked, disassembled and reassembled.

Working principle of the stroke measuring system

The externally arranged signal conditioner, the amplifier (VIC 112), the interconnecting cable and the measuring cylinder form the complete stroke measuring system.



Эл2-770-35-63, стр2, - всего6

The externally mounted amplifier (VIC 112) feeds the linear stroke transducer (DC 230), handles the signals and supplies finally a current (4-20mA) or voltage signal (+2 - 10V DC) which is proportional to the movement of the cylinder.

A temperature compensation circuit within the range of + 10°C to 250°C guarantees a driftfree and linear signal. USE ONLY THE ORIGINAL SIGNAL CABLE TYPE (admissible length: 2-16 m) between the measuring cylinder and the signal amplifier VIC 112.

The stroke measuring rod is encased and resistant to pressure peaks up to 300 bar (4350 p.s.i.) and to all fluid classes, such as HL-P, HFC or HFD. No special maintenance is required.

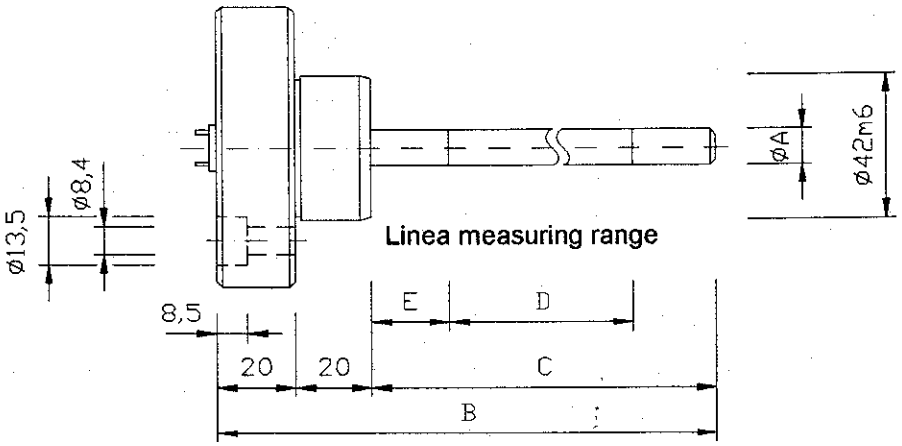
IMPORTANT!

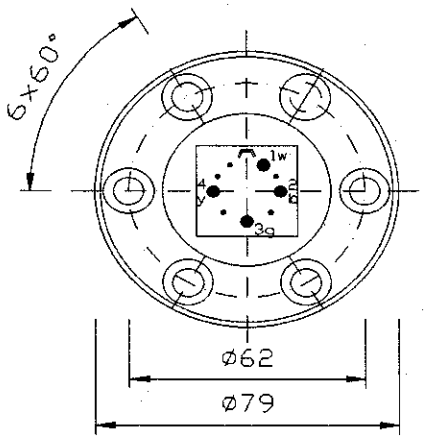
DURING REVISION WORK ON THE CYLINDER ATTENTION HAS TO BE PAID THAT THE MECHANICAL RE-INSTALLATION OF THE TRANSDUCER ROD AND THE ALU-TUBE IS 100% CONFORMING WITH DRAWING NO. B 105746. SHIFTINGS OF THE MENTIONED PARTS CAN CAUSE SIGNAL DISLOCATIONS.

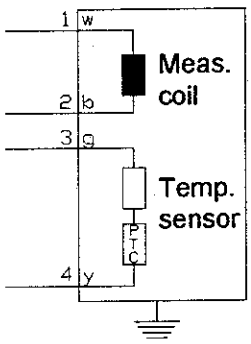
Calibration work of the cylinder is not required. The end position adjustment of the system is effected on the externally installed signal amplifier Module (VIC 112).

Fn2-770-35-63, cmp 3

Assembly layout and dimensions of the transducer unit, Type DC 23..





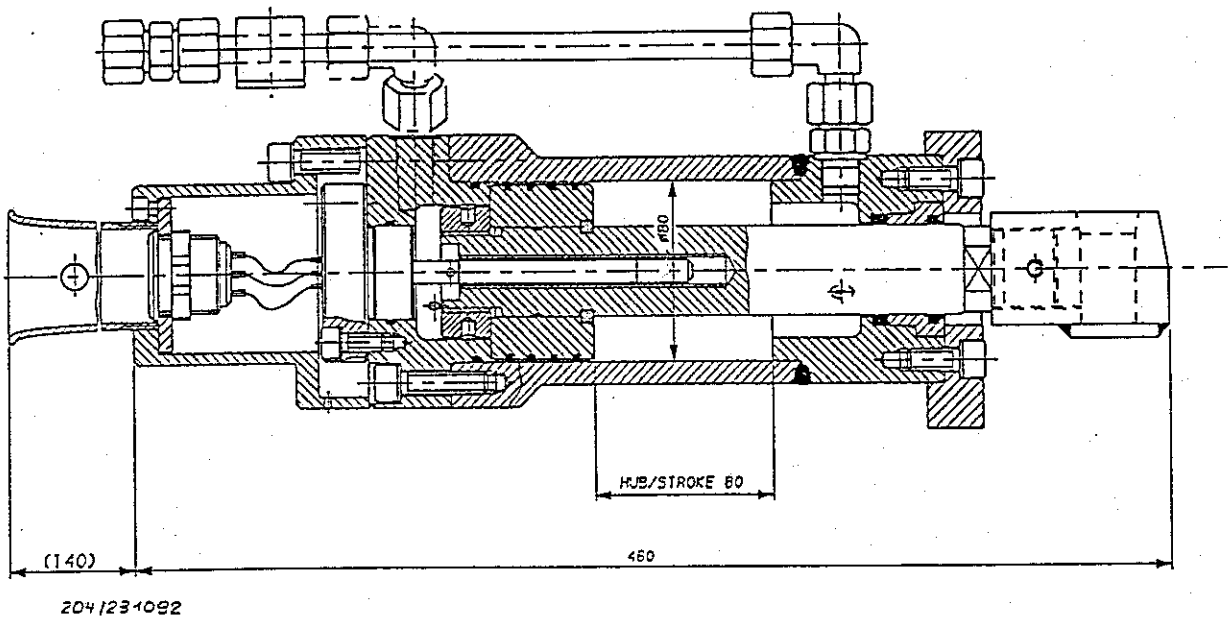


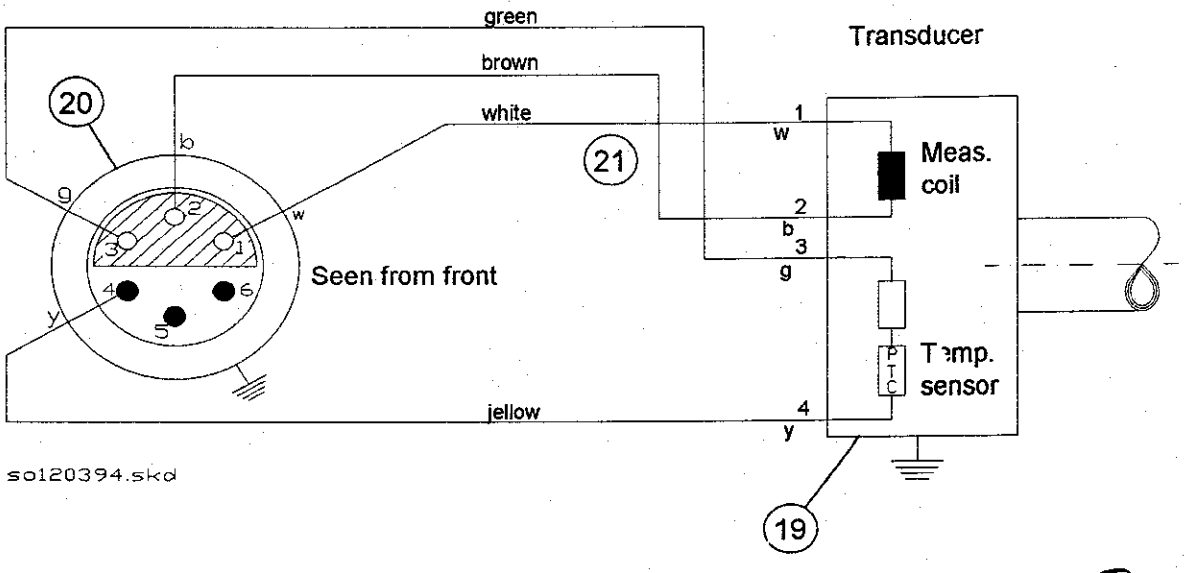
ORDERING NO.	TYPE	ØA	B	C	D	E	F
111-230-000-011	DC 230	10	165	125	80	20	25
111-231-000-011	DC 231	10	215	175	130	20	25
111-232-000-011	DC 232	10	285	245	200	20	25

so110394.skd

Эл2-770-35-63, стр. 4

Electrical interconnection between the stroke transducer and the connection plug for the interchangeable signal cable





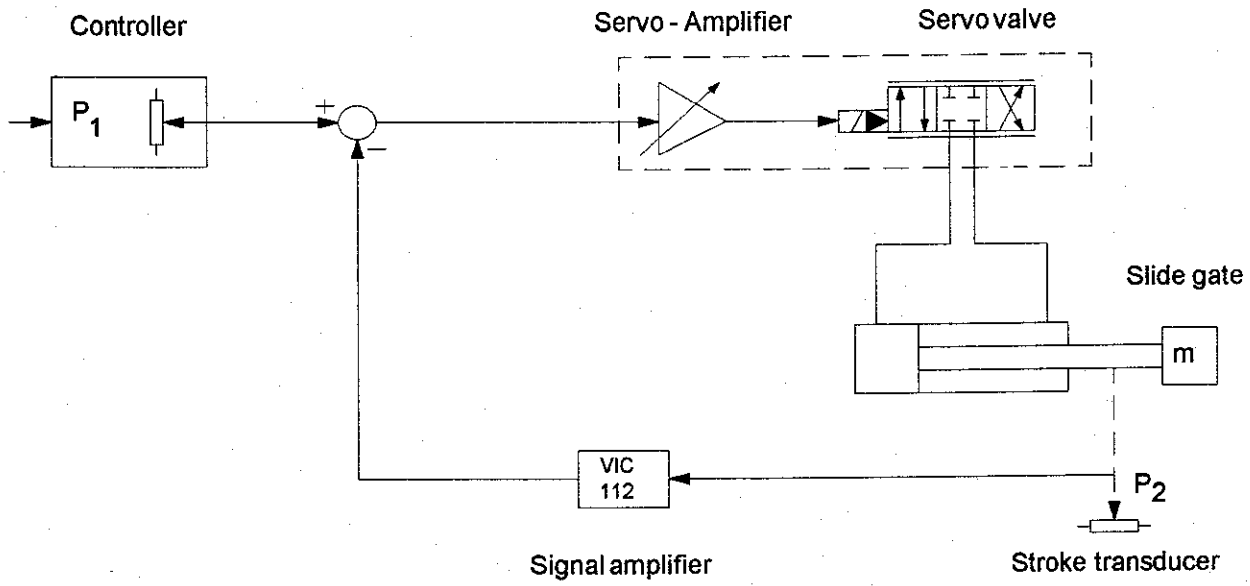
Эл2-770-35-63, стр 5

Electrical links from and to the stroke measuring cylinder

As a dynamically active element of the position control loop the cylinder has to fulfil the following main functions:

- Linear motor to control the throttling of the gate
- Stroke control unit for the definition of the opening degree of the gate

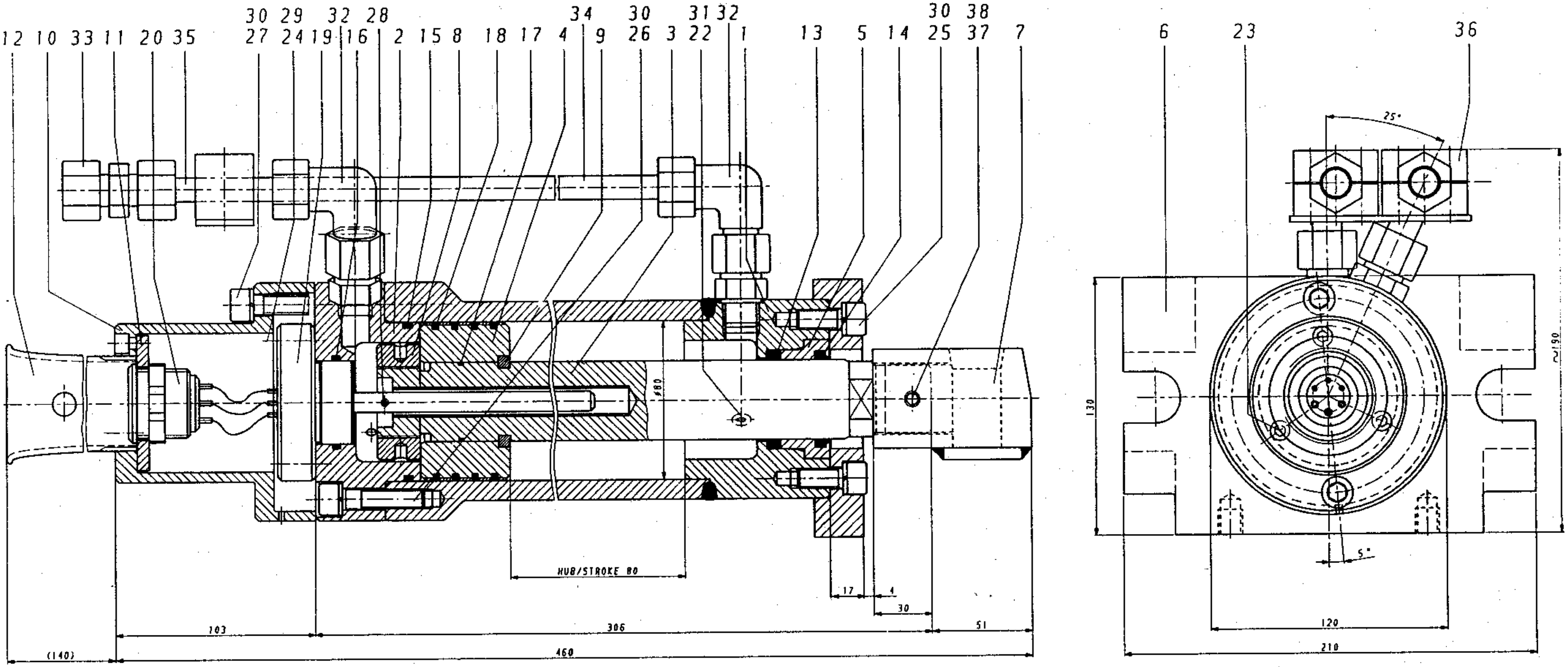
Operated like a linear motor it is also possible the work with the cylinder in the manual mode. However, if the automatic mold level control is switched on the stroke measuring system has to be fully operational.



In case of an interrupted or misaligned stroke signal (end position calibration varies more than 0,2-0,25V) a pouring in the automatic mode will cause serious problems.

The operator should be made aware how important it is to pay special attention regarding proper working and maintenance!

Jn2 - 770-35-63, cmp 6



STÜCKLISTE: 105747
PARTS LIST:

Эп2-770-35-64

HYDRAULIKZYLINDER
HYDRAULIC CYLINDER
HWS-80/80/E3/FS

Massstab / Scale 1:1

20.10.89 Te
20.10.89 HO

22.04.91

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INTERSTOP

M 8 105746 a

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INTERSTOP

Спецификация к черт.
Order Parts List
гидравлич. цилиндра ф80 Н80
HYDRAULIC CYLINDER MWS- 80/ 80/E3/F5

Part no.: 105747 Project no. 2014/419
Dwg no. : B105746 ROKOP
kg/piece: 23.5

Page : 1
Print : 09/06/95
Issue : 05/04/95
Doc no. : 8377

3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
1		104496 CYLINDER BODY S/MWS- 80/ 80 HINWEIS: ZYLINDERKOPF ZEICHNUNG : D100136 ZYLINDERROHR ZEICHNUNG : D100135	D100137		1	pcs
2		100313 CYLINDER COVER MWS- 80	D100313		1	pcs
3	P	100312 PISTON ROD COMPL. MWS- 80/ 80	D106056		1	pcs
4		100140 PISTON S/MWS- 80	E100140		1	pcs
5		100141 BUSH S/MWS- 80	E100141		1	pcs
6		100376 CYLINDER FLANGE F5 S/MWS-80	C100376		1	pcs
7		013329 COUPLING CLAW	N-13329.3		1	pcs
8		100314 NUT	E100314		1	pcs
9		100143 PISTON FIXING RING	E100143		1	pcs
10		105799 TERMINAL FLANGE	D105799		1	pcs
11		105801 FLANGE	E105801		1	pcs
12		105800 PLUG PROTECTION	E105800		1	pcs
13		102988 PISTON ROD SEAL 506-(40-5) GC BAL SEAL			1	pcs

Зп2-770-35-65, стр1, всего 3 стр.

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
14		**102989** WIPER SCRAPER P6-40 VITON			1	pcs
15		**102990** O-RING 72,62X3,53 VITON 90° SHORE AN/BS NO. 233			1	pcs
16		**103004** O-RING 40,95X2,62 VITON 70° SHORE AN/BS NO. 130			1	pcs
17		**102991** O-RING 34,65X1,78 VITON 90° SHORE AN/BS NO. 028			1	pcs
18		**102987** PISTON RING 80X3X3,5 GG			4	pcs
19	P	**106906** TRANSDUCER DC 230 STROKE 0-80 TYPE DC 230 COMPLETE			1	pcs
20		**104327** APPARATUS SOCKET TYPE ERA 5S 306 CTL	E104325		1	pcs
22		**102776** HEXAGON SOCKET HEAD CAP SCREW M5X10 DIN 912-8.8			2	pcs
23		**102145** HEXAGON SOCKET HEAD CAP SCREW M5X12 DIN 912-8.8			3	pcs
24		**102162** HEXAGON SOCKET HEAD CAP SCREW M8X20 DIN 912-8.8			6	pcs
25		**102175** HEXAGON SOCKET HEAD CAP SCREW M10X25 DIN 912-8.8			8	pcs
26		**102178** HEXAGON SOCKET HEAD CAP SCREW M10X40 DIN 912-8.8			4	pcs
27		**102783** HEXAGON SOCKET HEAD CAP SCREW M10X90 DIN 912-8.8			2	pcs
28		**102817** SPRING TYPE STRAIGHT PIN 05X020 DIN 1481			1	pcs

Эп 2-770-35-65, стр 2

Stopinc Aktiengesellschaft

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INTERSTOP

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
		SPRING STEEL				
29		**102308** RETAINING WASHER "SCHNORR"-VS8 SPRING STEEL			6	pcs
30		**102309** RETAINING WASHER "SCHNORR"-VS10 SPRING STEEL			14	pcs
31		**102908** SEALING RING A 5,5X8 DIN 7603-COPPER (FLAT GASKET)			2	pcs
32		**102738** ADJUSTABLE ELBOW FITTING EVW 12-PSR			2	pcs
33		**102706** STRAIGHT FITTING G 12-PS			2	pcs
34		**103020** HYDRAULIC TUBE, SEAMLESS ϕ12x1,5 DIN 2391/C ; ST 35.4		1	0.269	m
35		**103020** HYDRAULIC TUBE, SEAMLESS ϕ12x1,5 DIN 2391/C ; ST 35.4		1	0.08	m
36	P	**102957** PIPE CLAMP 12mm AC212 PD2			1	pcs
37		**102466** HEXAGON SOCKET SET SCREW M8X16 DIN 914-45H			1	pcs
38		**103025** SETBOLT 6X5 MS			1	pcs

End of list

In2-770-35-65, cmp 3

Stopinc Aktiengesellschaft

INTERSTOP

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Customer : Red October via Rokop
Project No.: 2014/419

6. Preparation Area / Devices / Tools

6.1 Layout Preparation Area
Схема подготовительной области } Схема размещения разливочного устройства

6.2 Layout Mounting Stand
Схема монтажного стенда

6.3 Test Hydraulic Unit (Item 40)
Проверка гидравлич. узла

6.4 Test Hydraulic Cylinder (Item 41)
Проверка гидравлич. цилиндра

6.5 Assembly Car (Item 46)
Сборка машины

6.6 Assembly Rack (Item 47)
Сборка рамы

6.7 Mounting Device for Middle Plate (Item 48)
Монтаж установки для средней пластины

6.8 Assembly and Testing Device for Expansion Compensator (Item 49)
Сборка и проверка механизма для расширения компенсатора (прогр. 49)

Description of Testing of Expansion Compensator Описание
Описание испытаний

6.9 Ramming Tool of Nozzle (Item 50)

6.10 Set of Tools (Item 51)

6.11 Torque Wrench

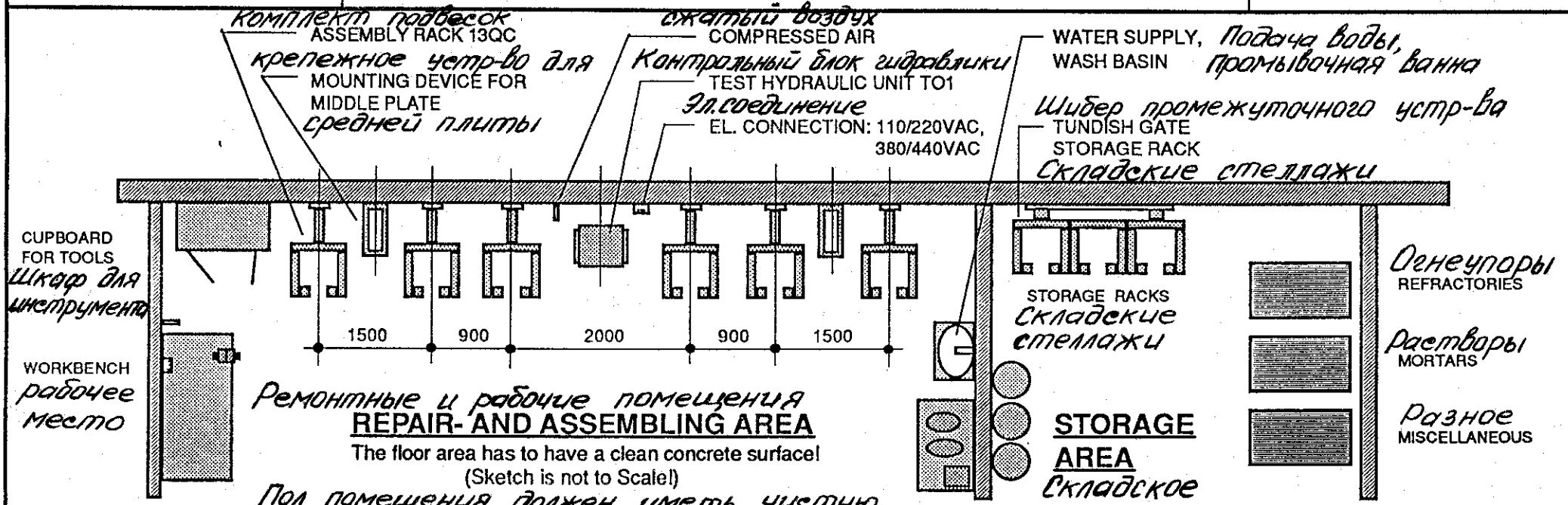
Эл2-770-35-66

Планировка промежуточного разливочного устр-ва.

INTERSTOP
STOPINC AKTIENGESELLSCHAFT
CH-6341 BAAR

LAYOUT AND ARRGT. OF A TUNDISH GATE PREPARATION- AND STORAGE AREA

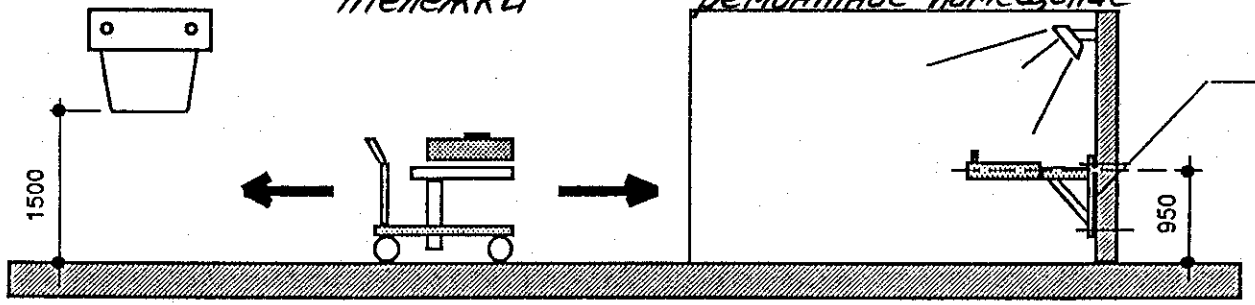
CUSTOMER : Rokop
PROJECT NO: 2014 / 419
DATE : NOV. 1994/ Ba.

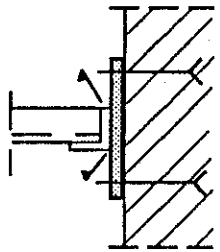


Установка на станине
TUNDISH ON STAND

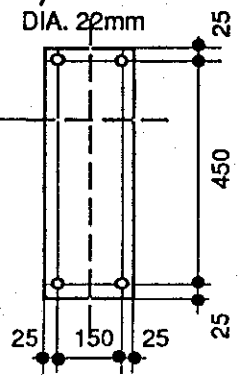
ASSEMBLY CAR
тележки

RECONDITIONING AREA
ремонтное помещение





FIXING DETAIL
MIDDLE PLATE MOUNT. DEV.
Средняя плита



TUNDISH GATE HANDLING PROCEDURE
Процесс обслуживания устр-ва

PREP13QC.PM4

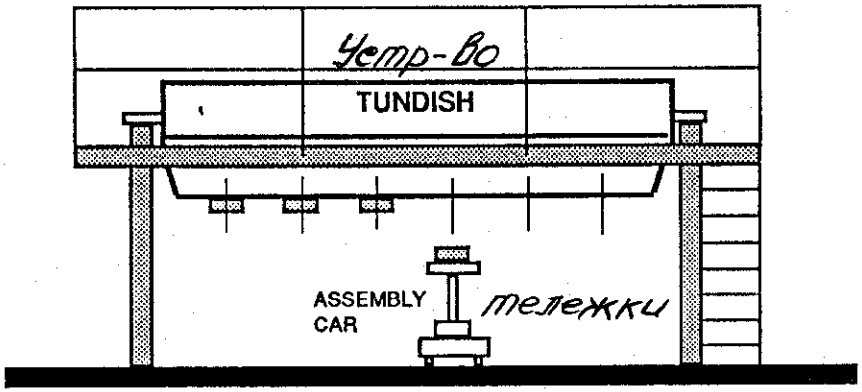
Эп2-770-35-67, лист 1, листов 2

Размещение разливочного промежуточного устр-ва А13QC

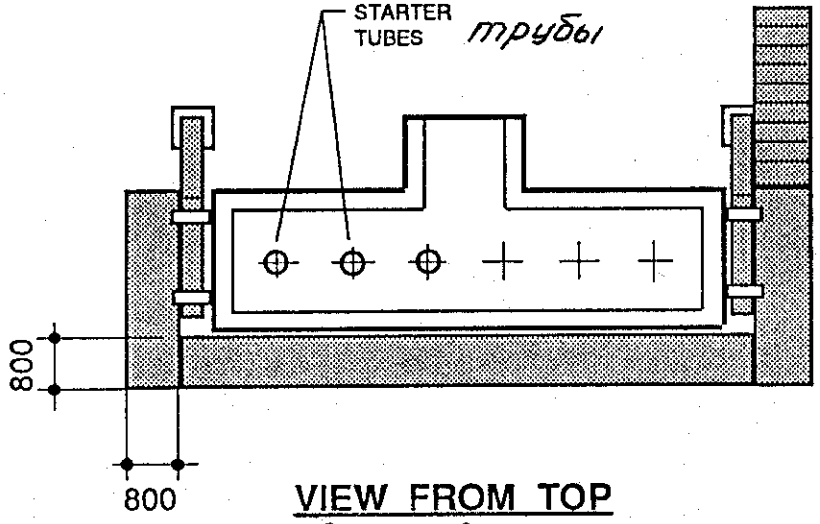
INTERSTOP
STOPINC AKTIENGESELLSCHAFT
CH-6341 BAAR

LAYOUT AND ARRGT. OF A 13QC-TUNDISH GATE MOUNTING STAND

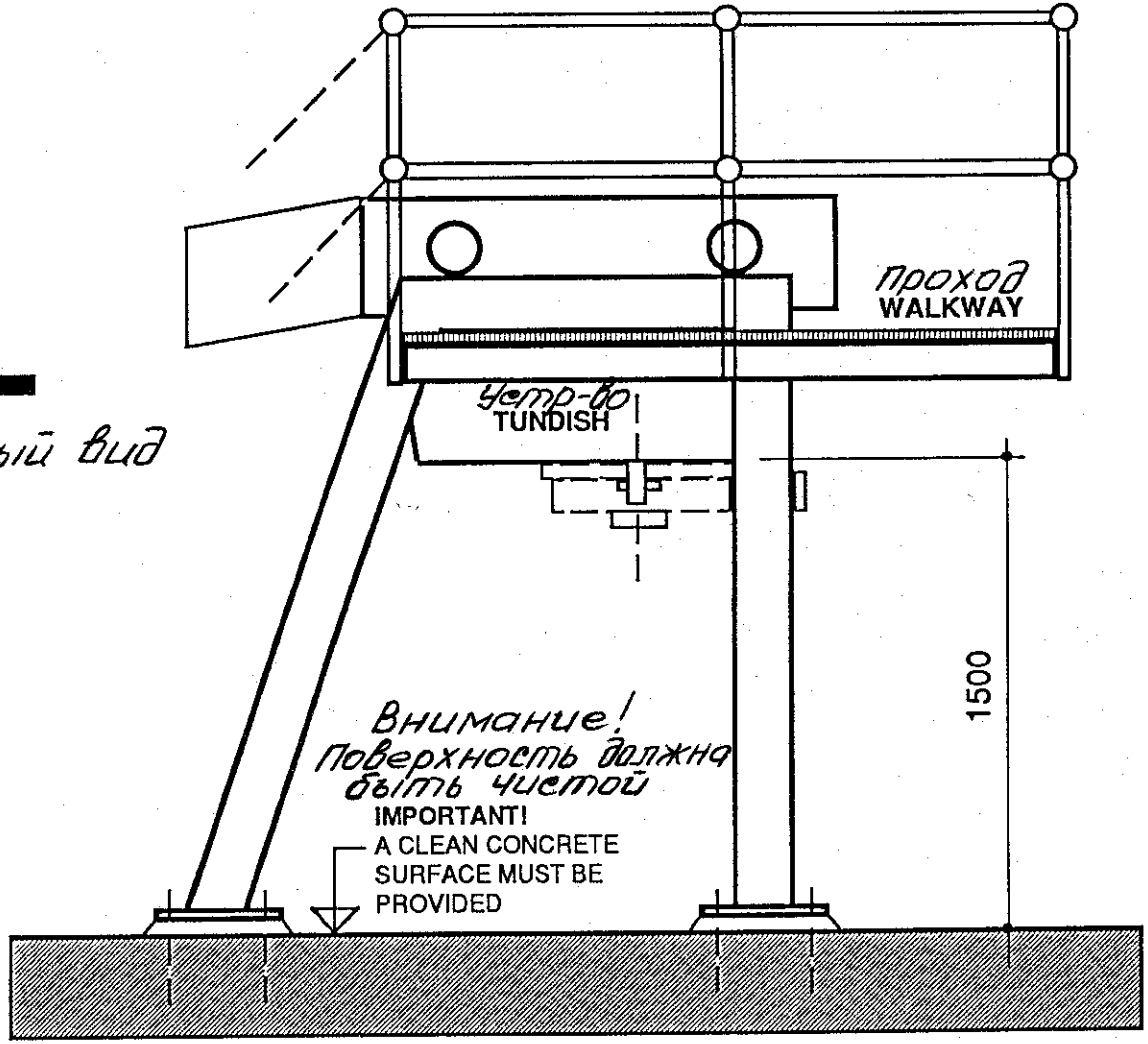
CUSTOMER : Rokop
PROJECT NO: 2014 1419
DATE : NOV. 1994/Ba.



FRONT VIEW Фронтальный вид



VIEW FROM TOP
Вид сверху



SIDE VIEW, STAND DESIGN
Вид сбоку, дизайн стенда

TS13STND

Эп2-770-35-67, лист 2

Stopinc Aktiengesellschaft

INTERSTOP

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 312864, Telex 862128 ist ch

Customer : Red October via Rokop
Proj. No.: 2014 / 419

Гидростанция типа Т01-1

6.3 Test Hydraulic Unit T01-1

6.3.1 Technical data - тех. характеристика

6.3.2 Functional description – описание функций

6.3.3 Installation – монтаж

6.3.4 Operation – операции

6.3.5 Maintenance instructions / intervals инструкция по обслуживанию

6.3.6 Hydraulic unit assembly drawing / parts list гидравлика

6.3.7 Electrial diagram (see Vol.II chapter 3) электрич. диаграмма (см. ч. 3)

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INTERSTOP

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Customer : Red October via Rokop
Proj. No.: 2014 / 419

6.3.1 Technical datas Техническая характеристика

Unit no.	: H- 5386
Project no. Номер проекта	: 2014 / 419
Year of construction Год изготовления	: 1995
Number of units supplied	: 1
Hydraulic diagram Гидравлич. диаграмма	: D 116775
Hydraulic parts list Перечень гидравлики	: 104173
Electrical diagram Схема электродиаграмм.	: E 107526
Electrical parts list Перечень электрочастей	: 1 07527
Supply voltage Напряжение	: 3x380V 50 Cycles циклы
Control tension Сила напряжения	: 24 V DC
Solenoid voltage Соленоид напряж.	: 24 V DC
Electrical motor power Мощность эл. двигателя	: 2,2 KW
Pump flow rate Мощность насоса	: 5,3 l/min л/мин
Tank capacity Мощность танка	: 25 LITRES л
Hydraulic medium Гидравлическая среда	: Минерал. масло (только) MINERAL OIL HLP ISO VG 68 (ONLY)
Max. working pressure Макс. рабочее давление	: 200 BAR (2900 PSI)

Эп 2-770-35-68, стр 2

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Proj. No.: 2014 / 419

Описание функций
6.3.2 Functional description

The hydraulic unit and the electrical control box are built into a solid frame.
The pump unit, the valves and the return- and filling filter are fixed to the tank lid.
All parts are easy exchangeable in case of a break-down.

Насос
PUMP UNIT

The pump unit is composed of a gear pump (item No. 5) with a flow capacity of 5,3 l/min., a pump carrier (item No. 3), a clutch (item No. 2) and an electro motor (item No. 1). The unit is fixed to the tank lid, and in case of a failure easy to replace.
It is a submerged pump type.The pump is started over the main switch "POWER ON/OFF". Is the pump working, lamp "POWER ON" lights solid.
In case it is not possible to start the pump, the motor protection switch within the electrical control panel has possibly to be pushed.

Масляный бак
OILTANK

The capacity of the oiltank (item No. 10) is approx .26 litres. The return-line filter (item No.14),oil filter-air breather filter (item No.16) and the oil level gauge (item No. 11) are fixed to the tank.

CAUTION: There is no automatic pump shut-off in case of too low fluid level.
Внимание!

VALVE FUNCTIONS Функциональный клапан

With the push buttons "OPEN/CLOSE" on the electrical control panel,or on the pendant control, the following valve functions will occur: The valve (item No. 31) necessary to close the pressureless circuit, will be shut. The according solenoid valve (item No. 32) will be activated simultanously, and the oil will be led to the cylinder.

Понижение давления
PRESSURE RELIEF

In case the cylinder is in an end position, and the according push button is still pressed, the pressure relief valve (item No. 30) opens and the oil flows back to the oiltank.

Эп2-770-35-68, стр. 3

Stopinc Aktiengesellschaft

INTERSTOP

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Proj. No.: 2014 / 419

6.3.3 Installation Монтаж

The hydraulic unit should be installed on a well protected place. Allow a free air flow around the unit.

Fill oil into the tank.

Connect the cylinder to the unit.

Connect the electrical main supply to the electrical control box.

Check the main power supply tension with the tension given on the name plate of the motor.

Check the rotation of the motor as follows:
Start the pump for a short moment, and check the rotation on the motor fan. The rotation has to be as marked with the arrow on the motor.

Bleed the pipelines and the hoses over the bleeding screws of the cylinder by moving the cylinder back- and foreward.

Refill oil if necessary.

6.3.4 Operation Операции

Turn switch "POWER ON/OFF" into position "ON". Should the pump not run, see functional description "PUMP UNIT".

Connect the cylinder to the gate.

Move the gate into the required position with the "OPEN/CLOSE" buttons either on the electrical control box or on the pendant. Is the according button released, the gate stops immediately.

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Proj. No.: 2014 / 419

Фильтрация
FILTRATION

(поз. 14)

The return-line filter (item Nos. 14) is necessary to keep the oil clean.
The total oil back flow to the tank is led over the return line filter.
The filter cartrigde has to be changed periodically. (see also maintenance instructions/intervalls).

Контроль давления
PRESSURE CONTROL

The working pressure is shown on the pressure gauge (item No. 50)

Фильтрация. Необходимо держать чистое масло в линейно-возвратном фильтре.
Патрон фильтра необходимо периодически менять (см. инструкцию по эксплуатации).

Контроль давления.
Работающий пресс выверяется манометром (поз. 50).

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INTERSTOP

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Proj. No.: 2014 / 419

Инструкция по эксплуатации

6.3.5 Maintenance instructions / intervals

После первых 50 часов работы

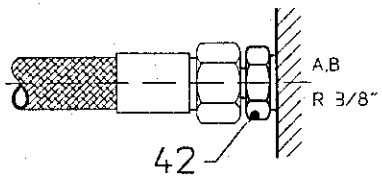
Type of maintenance Вид инструкции	After the first 50 working hours	Every 3 months Каждые 3 месяца	Every 6 months Каждые 6 месяцев	Every12 months Каждые 12 месяцев	Control / Repair Контроль
Change the filter cardrigde	X Замена патрона фильтра			X	New filter cartrigde Новый патрон фильтра
Check pressure build-up Проверка разъемного давления	X Установить в конечной позиции, держать кнопку нажатой, манометр показывает		X цилиндр 200 бар.		Move the cylinder into an end position, keep the button pressed, the pressure gauge has to show 200 bar
Check the oil level	X Проверка	X уровня масла			Oil level gauge of the tank Масляный уровнемер танка
Check the oil quality	X Проверка качества			X масла	Analysis, if necessary change the oil анализ необходимости замены масла
Check the pipe connectiones	Проверка патрубка		X		Tighten if necessary При необходимости затянуть гайку
Flush the system Жидкостная	X система		X		Connect the hoses, and flush approx. 5 min.,by pressing open/ close buttons.

Присоединить шланги и промыть примерно 5 мин. при открытом прессе закрыть клапан.

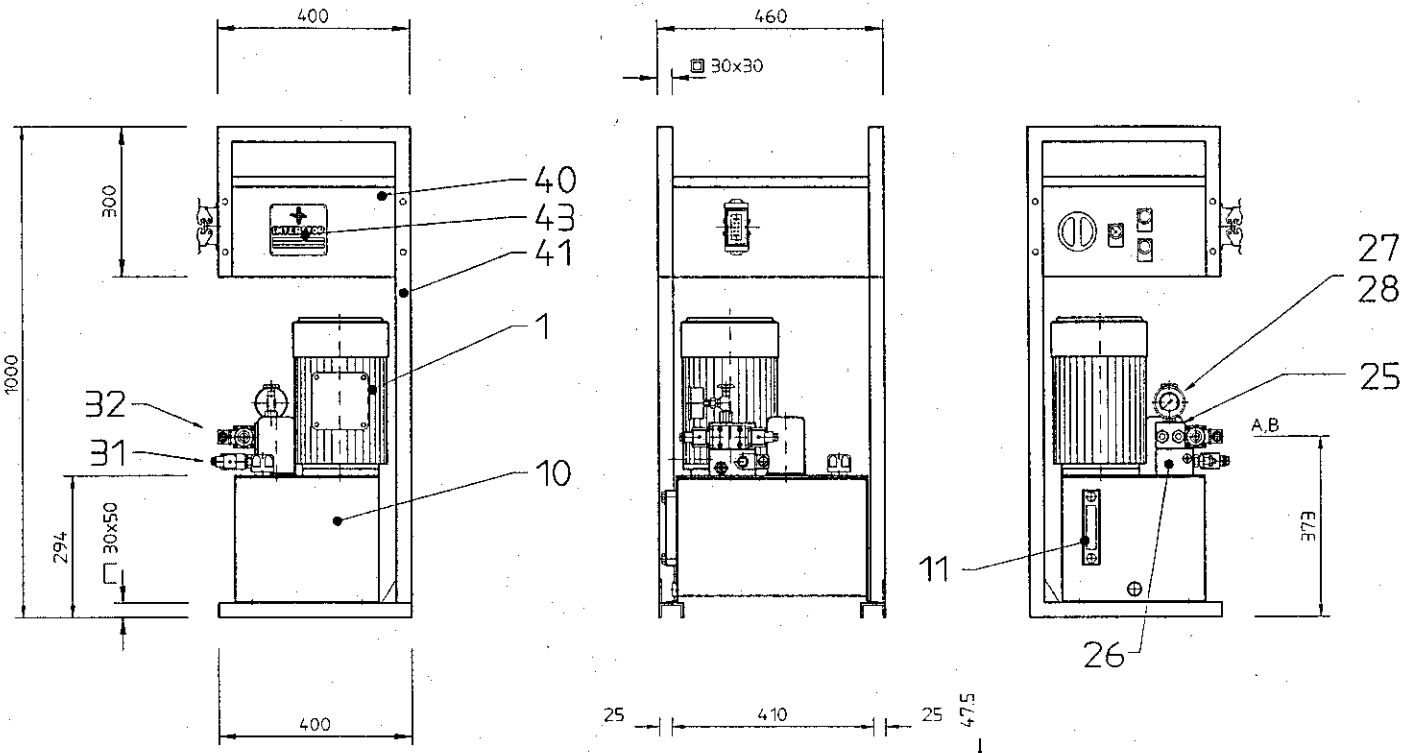
Подключение деталей

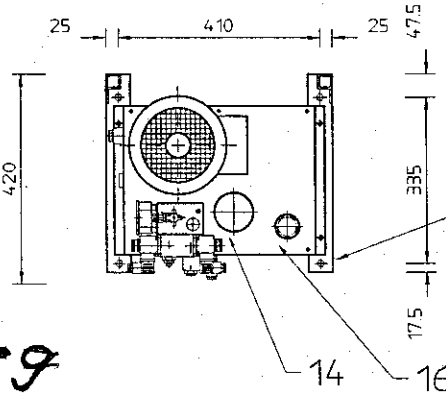
ANSCHLUSS DETAILS

CONNECTION DETAILS



DICHTKEGELANSCHLUSS 24? - M20x1,5 (DIN 2353)
FOR HOSE CONNECTION :
SWIVEL JOINT 24? - M20x1,5 (DIN 2353)





крепежные цели
BEFESTIGUNGSLOECHER
MOUNTING HOLES

GERÄTE TYP UNIT TYPE		T01-1	
FREQUENZ (Hz) FREQUENCY (Cycles)		50	
NETZ SPANNUNG MAIN POWER SUPPLY		3x380V	
LEISTUNG MOTOR MOTOR POWER	(kW)	2.2	
DREHZAHL MOTOR MOTOR SPEED	(min^{-1})	1450	
FÖRDERVOLUMEN PUMPE PUMP DISPLACEMENT	(cm^3/U) (cm^3/rev)	3,64	
FÖRDERLEISTUNG PUMP CAPACITY	(l/min)	5.3	
STEUER- UND VENTILSPANNUNG CONTROL AND SOLENOID TENSION		24VDC	
MAX. SYSTEMDRUCK SYSTEM PRESSURE MAX.	(bar)	200	
GEWICHT WEIGHT	(kg)	64	
BETRIEBSFLÜSSIGKEIT : NUR MINERALOEL HLP ISO VG 68 OPERATING FLUID : ONLY MINERAL OIL HLP ISO VG 68			

Гидростанция T01-1

Эп2-770-35-69 Гидравлика

ROKOP
PITTSBURGH, PENNSYLVANIA, USA

			DATE	17.3.95	UNIT NO: H-5386 PROJECT NO.: 2014/419 CUSTOMER: ROKOP, USA
			DRAWN	Sr	
			CHECKED	Sr	
			SCALE	1:10	

TEST HYDRAULIK AGGREGAT
TEST HYDRAULIC UNIT
T01-1
ZUSAMMENSTELLUNG/ASSEMBLY

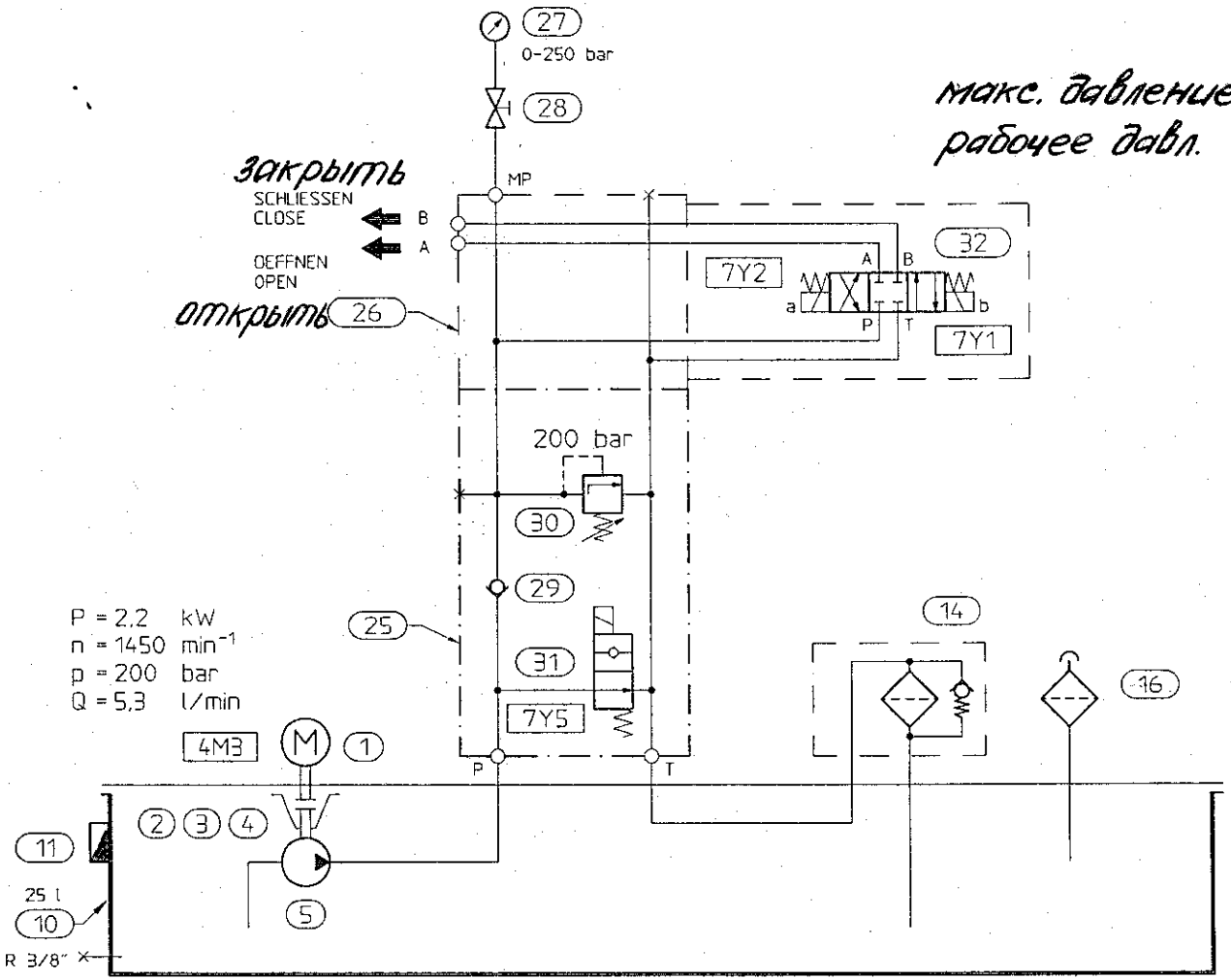
REFERENCE		REV	DATE	NAME
104173	PARTS LIST (DOC NO 8267)			
0116775	HYDRAULIC FLOW DIAGRAM	A		

INTERSTOP® Stopinc Aktiengesellschaft CH-6340 BAAR

ORIGIN: 0116100

MICRO	FORMAT	NO	SHEET	INDEX
	D	116774	OF	

REPL FOR | REPL BY



Напряжение в сети

NETZ SPANNUNG MAIN POWER SUPPLY	3 x 380V 50 Hz/Cycl.
MAX. SYSTEMDRUCK MAX. SYSTEM PRESSURE	200 bar
NOM. ARBEITSDRUCK NOM. OPERATING PRESSURE	150 bar
DRUCKFLUSSIGKEIT | HYDRAULIC FLUID ONLY MINERAL OIL HLP ISO VG68	

макс. давление →
рабочее давл. →
давление жидкости

Гидростанция ТО1-1
Гидравлическая схема

Эп2-770-35-70

				DATE	17.3.95	UNIT NO. H-5386	TEST HYDRAULIK AGGREGAT
				DRAWN	Sr	PROJECT NO.: 2014/419	TEST HYDRAULIC UNIT
				CHECKED	Sr	CUSTOMER ROKOP, USA	TO1-1
				SCALE			HYDRAULIC FLOW DIAGRAM
104173	PARTS LIST			INTERSTOP® Stopinc Aktiengesellschaft CH-6341 BAAR		MICRO	FORMAT D	NO 116775	SHEET	INDEX
D116774	ASEMBLY DRAWING	A							OF	
REFERENCE		REV.	DATE NAME	ORIGIN D116101		REPL. FOR		REPL. BY		

ROKOP PITTSBURGH, PENNSYLVANIA, USA

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Спецификация к черт.
Order Parts List
Гидростанция типа T01-1
TEST HYDRAULIC UNIT TYPE T01-1

часть
Part no.: 104173
Dwg no. :
kg/piece: 66

проект
Project no. 2014/419
ROKOP

Page : 1
Print : 09/06/95
Issue : 20/03/95
Doc no. : 8267

3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
						шт.

Item no. деталь №	90
Unit no. комплект №	H-5386
Assembly drawing механизм	D116774
Hydraulic flow diagram	D116775 гидравлическая диаграмма
Electrical diagram	E117526 электродиаграмма
Main power supply макс. мощность	3x380V / 50 Cycl.
Operating fluid раб. жидкость	Mineral oil HLP ISO VG68 минеральное масло

1	**114878**		1 pcs
	AC MOTOR 2,2/2,6 kW мотор		
	230VD/400VY 50Cycl. 1450 Rev/min		
	AR 100 L-4S	об/мин.	
	254VD/440VY 60 Cycl. 1740 Rev/min		
	INSUL.CL.F IP54 B14C (D=160mm)		
2	**114898**		1 pcs
	COUPLING D=28/D=10 CON(1:8) Соединение		
	ND 11-G47.5		
3	**114896**		1 pcs
	BELLHOUSING LSE 166		
4	**114897**		1 pcs
	ZENTRIERRING RC1-254 центрирующее кольцо		
5	**114865**	E116753	1 pcs
	GEAR PUMP 3,64 ccm/Rev шестеренчатый насос		
	KV 1P/3.8-D-CO 001-A-A-E		
10	**114895**		1 pcs
	OIL RESERVOIR 25L IHS 25 масляный резервуар		
	COVER LV крышка		
11	**116195**	E103848	1 pcs
	OIL LEVEL GAUGE SIZE 127 WITH THERMOMETER		
	FSA 127.1.1/T12 масляный щуп с термометром		

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Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
						шт.
		Элемент фильтра				
14		116424 FILTER ELEMENT CARTRIDGE FT 4899 FOR RETURN LINE FILTER 15 mic (для возвратного линейного фильтра)			1	pcs
16		114891 OIL FILTER-AIR BREATHER FILTER TR-1 масляный фильтр			1	pcs
25		114894 основной блок GRUNDBLOCK LV6 DU BEGRENZUNGS-/UMLAUFMODUL (ограничение/возврат. модуль)			1	pcs
26		114012 вертикальная укладочная плита VERTICAL STACKING PLATE размер SIZE 6 LV6P			1	pcs
27		116423 манометр (дизайн стандартный) PRESSURE GAUGE SIZE 63/0-250 BAR 213.53.063 STANDARD DESIGN, CENTRE BACK CONNECTION			1	pcs
28		116322 манометр MANOMETER PROTECTION VALVE 1/4" FT 291			1	pcs
29		114862 Обратный клапан CHECK VALVE VU-LN OD.44.02.00-02-01			1	pcs
30		114859 манометр с обратной шайбой PRESSURE RELIEF VALVE-CARTRIDGE VS-30-NC 100-350 BAR бар 04.11.18-03-99-35			1	pcs
31		114861 2-ходовой клапан 2/2-WAY DIRECTIONAL SEAT VALVE патрон — CARTRIDGE VEI-A2-06-1 24VDC OD.15-06-56-OC			1	pcs
32		114863 E116754 Контрольн. клапан 4/3-WAY DIRECTIONAL CONTROL VALVE SIZE 6 SOLENOID OPERATED 24VDC действующий соленоид DHI-0711/N24DC/1x			1	pcs
40	P	107527 Электроконтроль ELECTRICAL CONTROL TEST HYDRAULIC UNIT (Устр-во для контроля гидравлики) TYPE EST-T01-1/2			1	pcs
41		116104 стальной каркас STEEL FRAME 1000x400x30			1	pcs
42		112794 Нелегир. часть сборной детали STRAIGHT MALE STUD FITTING			2	pcs

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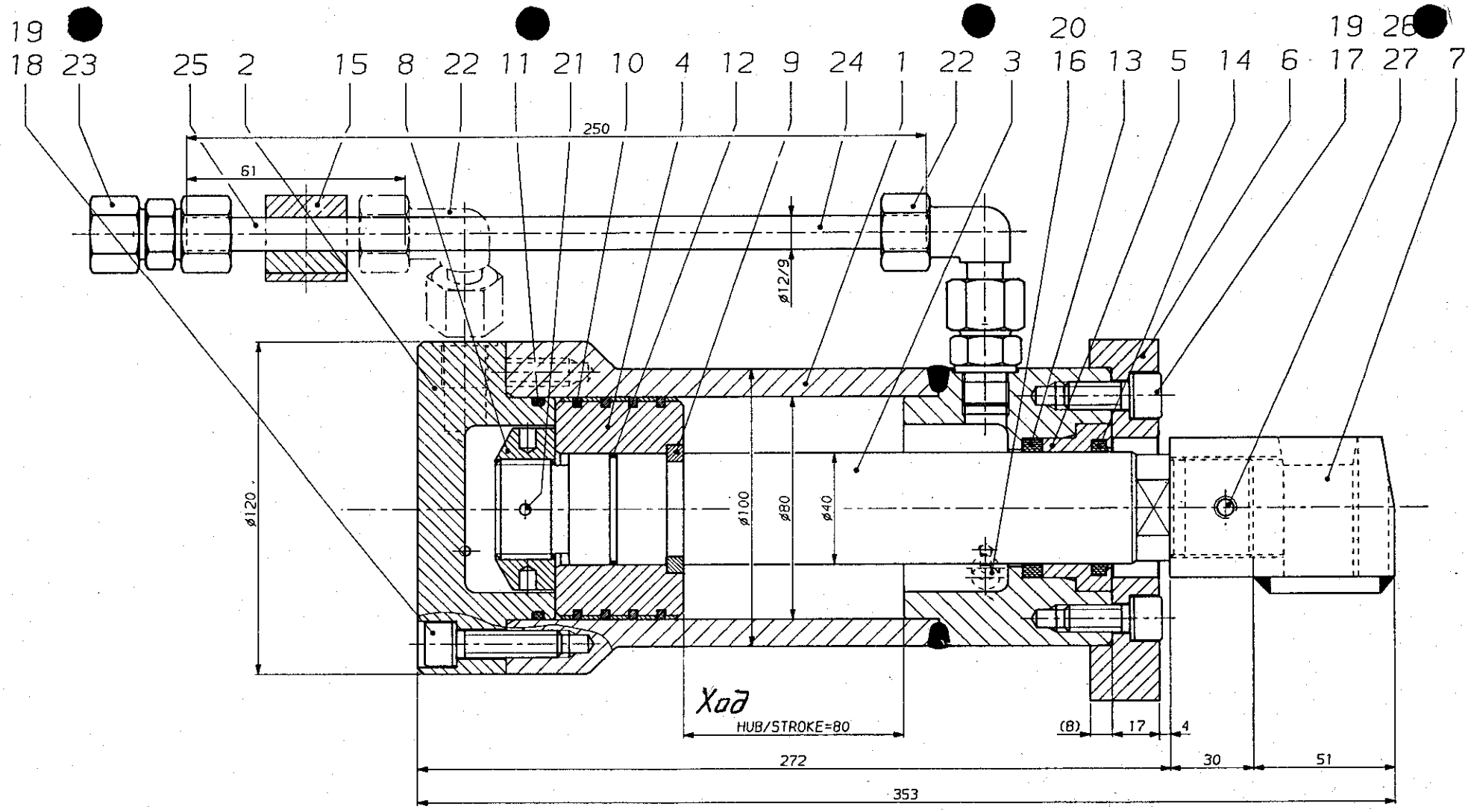
Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
						шт.
		GE 12-PSR-ED				
43		107993 TYPE LABEL 120x100mm фабричная бирка			1	pcs

End of list

Эп2-770-35-71, стр.3



Цилиндр гидравлический

TEILENUMMER / PART NUMBER	100606
GEWICHT / WEIGHT	28 kg

Ersetzt durch / Replaced by	-	Massstab / Scale	1:1	gezeichnet / Drawn	18-APR-90	To
Ersatz fuer / Replacement for	-			geprueft / Checked	18-APR-90	MG
a	01-JUN-90	TOALDO				
b	01-FEB-94	TOALDO				

HYDRAULIKZYLINDER
HYDRAULIC CYLINDER
S-80/80/R1/F5

Эп2-770-35-72

INTERSTOP Stopinc Aktiengesellschaft CH-6341 BAAR

MICROFILM	FORMAT	NO.	INDEX
	C	101738	b

Stopinc Aktiengesellschaft

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Спецификация к черт.
Order Parts List
Гидравлический цилиндр
HYDRAULIC CYLINDER S- 80/ 80/R1/F5

Часть №
Part no.: **100606**
Dwg no. : C101738
kg/piece: 21 кг/шт

Проект №
Project no. 2014/419
ROKOP

Page : 1
Print : 09/06/95
Issue : 04/04/95
Doc no. : 8364

3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty Unit (Кол-во)
1		**104496** CYLINDER BODY S/MWS- 80/ 80	D100137 Корпус цилиндра		1 pcs
		HINWEIS: Цилиндрическая головка, чертеж ZYLINDERKOPF ZEICHNUNG : D100136 ZYLINDERROHR ZEICHNUNG : D100135 цилиндрич. труба, чертеж			
2		**100138** CYLINDER COVER R1 S- 80 Кожух цилиндра	D100138		1 pcs
3		**105072** PISTON ROD S- 80/ 80 Стержень поршня	D100139		1 pcs
4		**100140** PISTON S/MWS- 80 Поршень	E100140		1 pcs
5		**100141** BUSH S/MWS- 80 Втулка	E100141		1 pcs
6		**100376** CYLINDER FLANGE F5 S/MWS-80 Цилиндр. фланец	C100376		1 pcs
7		**013329** COUPLING CLAW Клещевое соединение	N-13329.3		1 pcs
8		**100144** NUT S- 80 Гайка	E100144		1 pcs
9		**100143** PISTON FIXING RING Кольцевой поршень (фиксированный)	E100143		1 pcs
10		**102987** PISTON RING 80X3X3,5 GG Поршневое кольцо			4 pcs
11		**102990** O-RING 72,62X3,53 VITON 90° SHORE Кольцо AN/BS NO. 233			1 pcs
12		**102991** O-RING 34,65X1,78 VITON 90° SHORE Подпорка AN/BS NO. 028			1 pcs
13		**102988**			1 pcs

Кольцо-

Эп2-770-35-73, стр1, всего 2.

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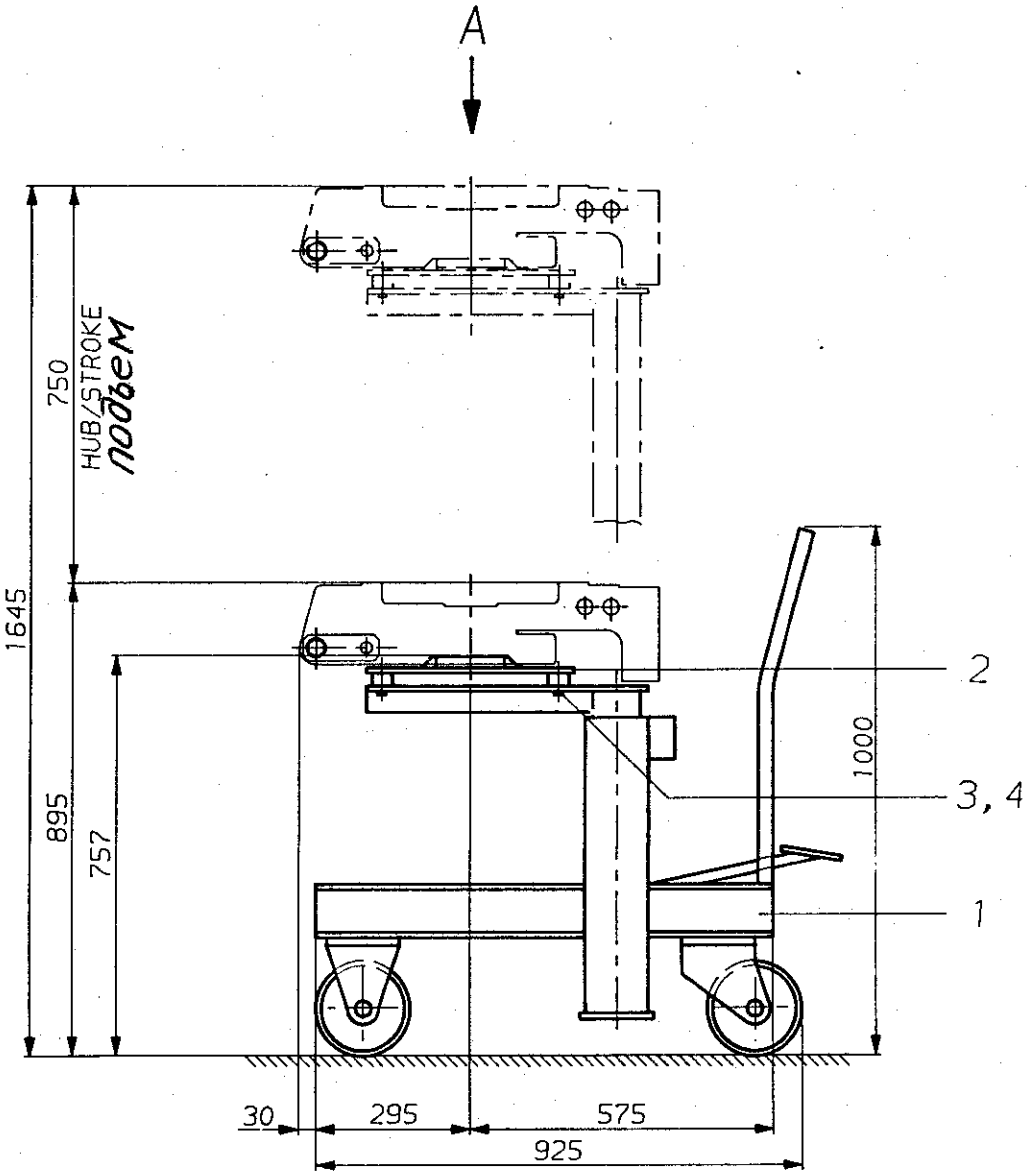
Гидравлический цилиндр

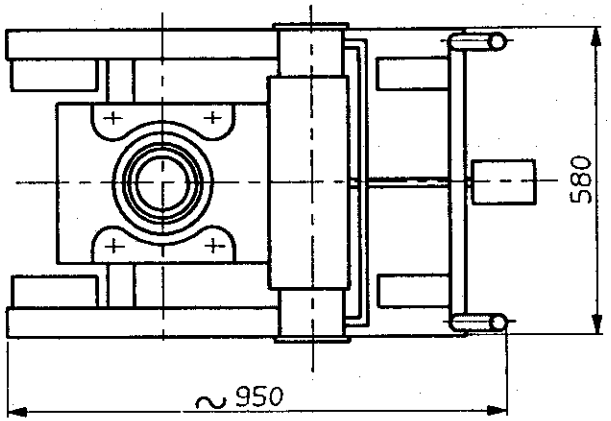
Doc no. 8364 HYDRAULIC CYLINDER S- 80/ 80/ Date: 09/06/95

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
		Поршень PISTON ROD SEAL 506-(40-5) GC BAL SEAL				шт.
14		102989 очищающий скрепер WIPER SCRAPER P6-40 VITON			1	pcs
15	P	102957 Державка для труб PIPE CLAMP 12mm AC212 PD2			1	pcs
16		102776 Винт гексагональной муфты HEXAGON SOCKET HEAD CAP SCREW M5X10 DIN 912-8.8			2	pcs
17		102175 HEXAGON SOCKET HEAD CAP SCREW M10X25 DIN 912-8.8			8	pcs
18		102178 HEXAGON SOCKET HEAD CAP SCREW M10X40 DIN 912-8.8			8	pcs
19		102309 промыватель RETAINING WASHER "SCHNORR"-VS10 SPRING STEEL пружинная сталь			19	pcs
20		102908 Уплотняющее кольцо SEALING RING A 5,5X8 DIN 7603-COPPER (FLAT GASKET) Плоская прокладка			2	pcs
21		102818 Гладкий стержень пружинного типа SPRING TYPE STRAIGHT PIN 05X050 DIN 1481 SPRING STEEL пружинная сталь			1	pcs
22		102738 регулируемый фитинг ADJUSTABLE ELBOW FITTING EVW 12-PSR			2	pcs
23		102706 Прямой фитинг STRAIGHT FITTING G 12-PS			2	pcs
24		103020 Гидравлическая труба, бесшовная HYDRAULIC TUBE, SEAMLESS ϕ12x1,5 DIN 2391/C ; ST 35.4		1	0.27	m
25		103020 HYDRAULIC TUBE, SEAMLESS ϕ12x1,5 DIN 2391/C ; ST 35.4		1	0.062	m
26		103025 Набор болтов SETBOLT 6X5 MS			0.08	pcs
27		102470 Набор винтов HEXAGON SOCKET SET SCREW M8X16 DIN 915-45H			1	pcs

Эп2-770-35-73, стр 2.



Вид
ANSICHT
VIEW A



Эп 2-770-35-74

Монтажная тележка

TEILENUMMER / PART NUMBER 100923		GEWICHT / WEIGHT 157 kg		
II I	Ersetzt durch / Replaced by: – Ersatz fuer / Replacement for: –	Massstab / Scale 1:10	Gezeichnet / Drawn 16-JAN-87	HO
			Gepruefft / Checked 16-JAN-87	Hü

Монтажная тележка
MONTAGEWAGEN
ASSEMBLY CAR
130C

INTERSTOP Stopinc Aktiengesellschaft CH-6340 BAAR

MICROFILM	FORMAT	NO.	INDEX
M	D	103226	–

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 31 28 64, Telex 862 128 ist ch

INTERSTOP

Спецификация к черт.
Order Parts List
тележки монтажной
ASSEMBLY CAR 13QC

Part no.: **100923** Project no. 2014/419
Dwg no. : C103226 ROKOP
kg/piece: 155

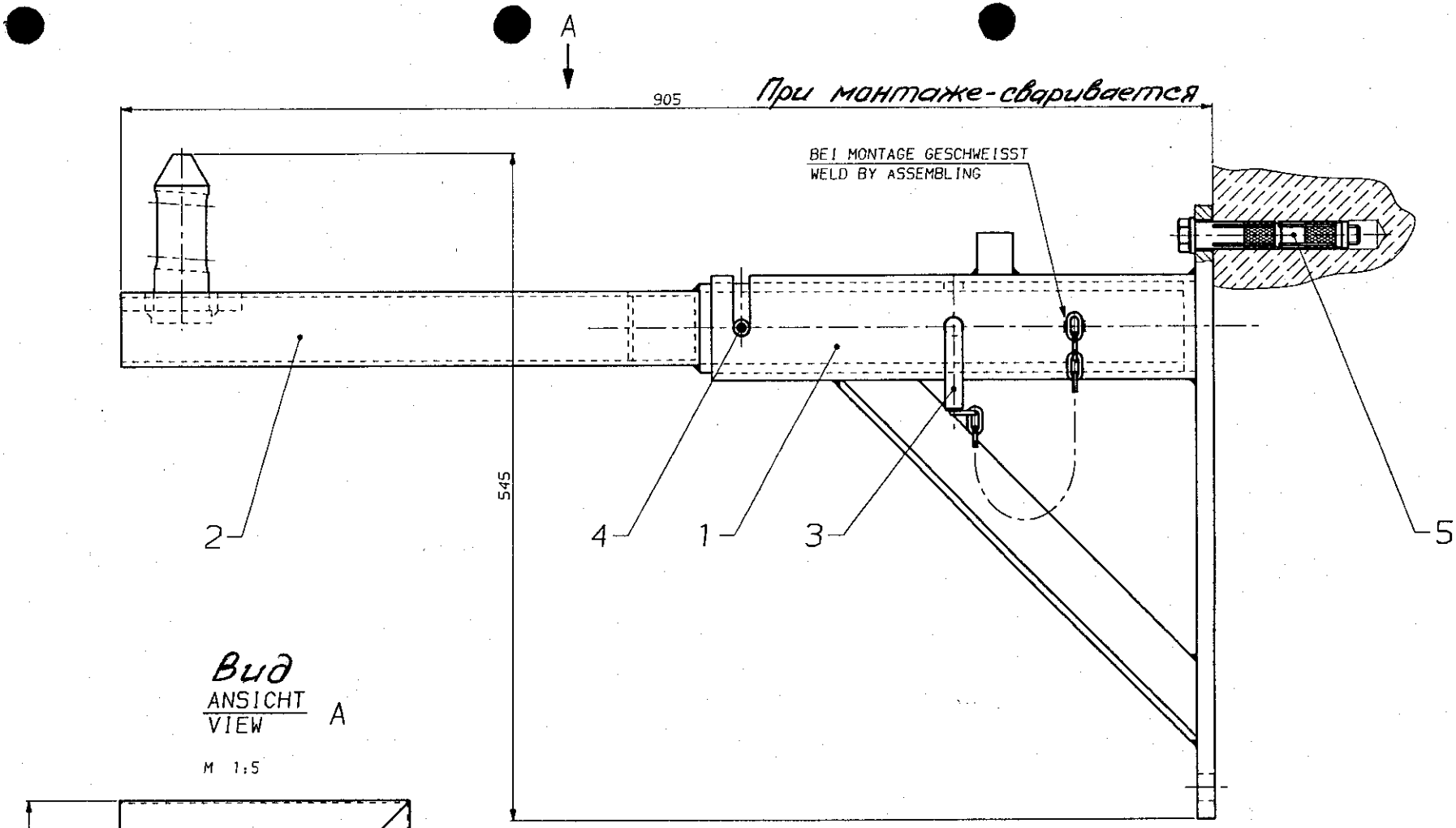
Page : 1
Print : 09/06/95
Issue : 04/04/95
Doc no. : 8366

3100-018.FOE

Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
						шт.
1		**014360**	L-14360.3		1	pcs
		LIFTING TABLE SPEC. 13QC/33QC подъемный стол				
2		**013864**	L-13864.2		1	pcs
		ADAPTER 13QC адаптер				
3		**102091** болт с шестигранной головкой			4	pcs
		HEXAGON HEAD SCREW M10X30 DIN 933-8.8				
4		**102294** пружинная прокладка (шайба)			4	pcs
		SINGLE COIL SPRING WASHER A 10 DIN 127				
		SPRING STEEL пружинная сталь				

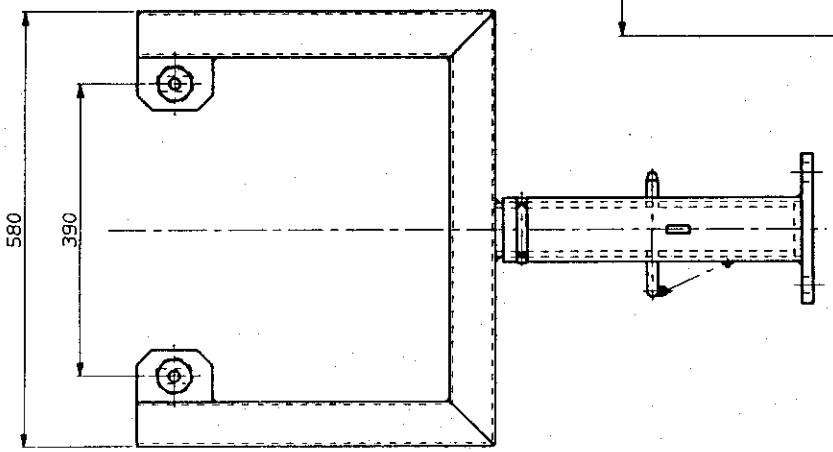
End of list

Эл2-770-35-75



Вид
ANSICHT
VIEW A

M 1:5



Эл2-770-35-76

Монтажная стойка

TEILENUMMER / PART NUMBER	013577	GEWICHT / WEIGHT	37kg
Ersetzt durch / Replaced by: -		Massstab / Scale 1:2.5 (1:5)	Gezeichnet / Drawn 28-MAR-88 To
Ersatz fuer / Replacement for: L-13577.2a			Geprueft / Checked 30-MAR-88 To
a 18-AUG-88 TOALDO			

MONTAGEGESTELL
ASSEMBLY RACK
130C

INTERSTOP Stopinc Aktiengesellschaft CH-6340 BAAR

MICROFILM	FORMAT	NO.	INDEX
M.	C	103345	a

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 312864, Telex 862128 ist ch

INTERSTOP

Спецификация к черт.
Order Parts List
монтажной тележки
ASSEMBLY RACK 13QC

Часть
Part no.: **013577**
Dwg no. : C103345
kg/piece: 37

Проект
Project no. 2014/419
ROKOP

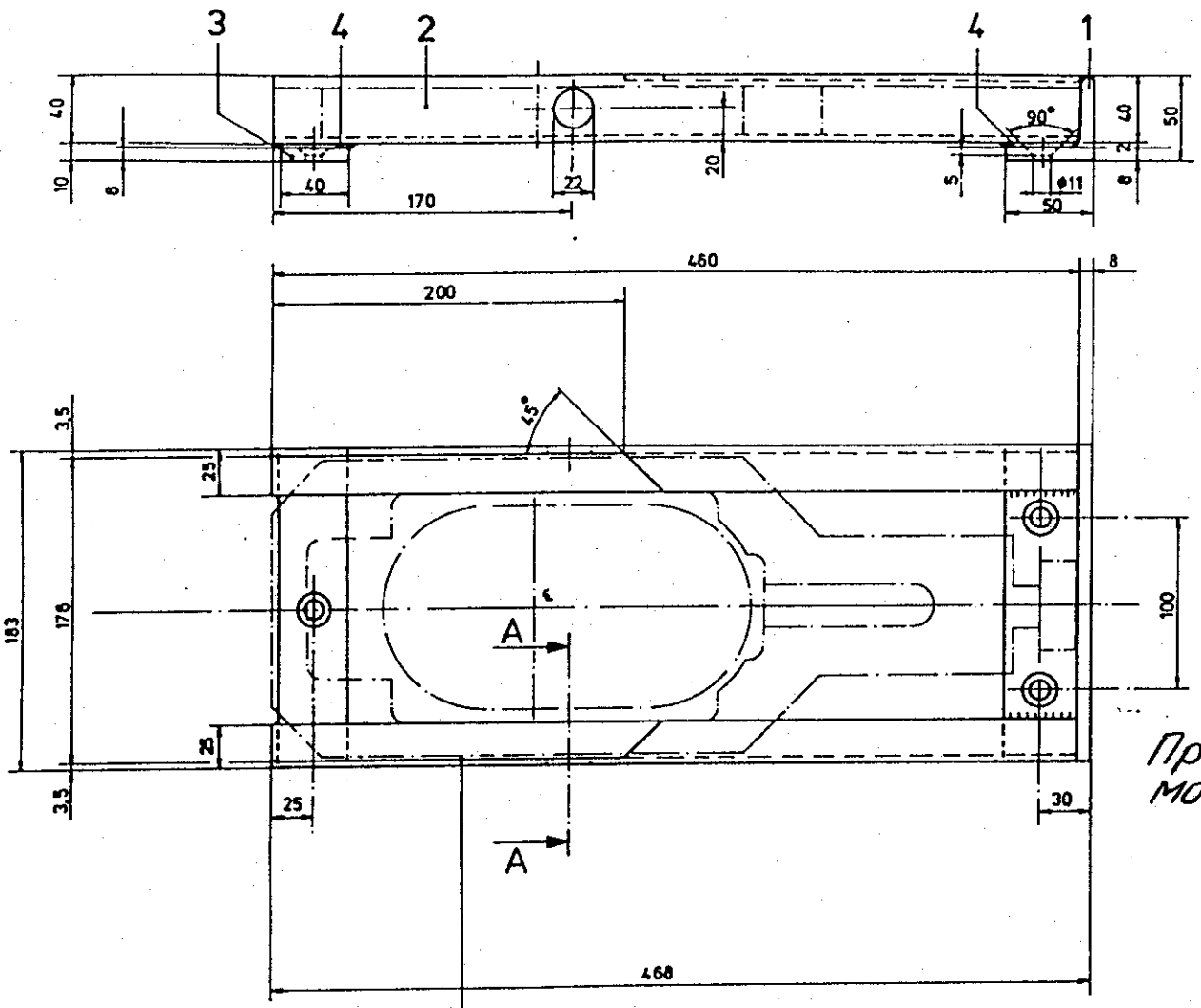
Page : 1
Print : 09/06/95
Issue : 04/04/95
Doc no. : 8369

3100-018.FOE

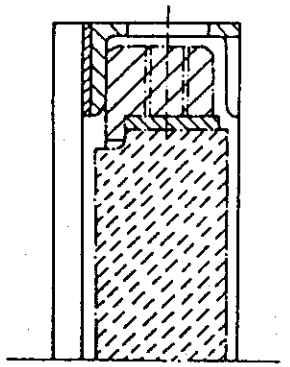
Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
					Кол-во	шт.
1		**013578** CONSOLE 13QC Консоль	L-13578.2		1	pcs
2		**013579** ROTATING FRAME 13QC Вращающийся каркас	L-13579.2		1	pcs
3		**005170** LOCKING PIN Стопорный штифт	5.170.4		1	pcs
4		**102160** Винт гексагональной муфты HEXAGON SOCKET HEAD CAP SCREW M8X12 DIN 912-8.8			1	pcs
5		103350 ANCHOR CLICKER Якорная защелка			3	pcs

End of list

Эп2-770-35-77



A-A M1:1



ITEM 48

Приспособление для монтажа средней плиты

Эп2-770-35-78

Стальные листы ~ 4Kg

	4	Stahlblech 40X25X2	4	St 37	0,015		
	1	Flachstahl 40X8X183	3	St 37	0,4	DIN 1017	
	2	Coulissenstahl U40X25X3,5X460	2	USt 37-2	1,2		
	1	Winkel 50X8X183	1	USt 37-2	1	DIN 1028	

Ausbrennen
Burn out
Выжигание

Kanten gebrochen
Edges chamfered
Обрубка канта

Schweissnähte — 2,5-E
Welding seams
Сварной шов

		1:2	20.11.85	To
a 29.1.88 To		MONTAGEVORRICHTUNG FÜR MITTELPLATTE		
		MOUNTING DEVICE FOR MIDDLE PLATE		
		13 QC		

INTERSTOP Stopinc Aktiengesellschaft CH-6340 BAAR

C 101214 a

INTERSTOP STOPINC AKTIENGESELLSCHAFT CH-6340 BAAR	ASSEMBLY AND TESTING DEVICE FOR EXPANSION COMPENSATOR	E 105125	
		DATE: FEB.89	PAGE:1 / 6

Инструкция по монтажу и испытанию расширяющегося компенсатора

Содержание
CONTENT

Крутящий момент для удлинения (расширения) компенсатора
NOTE : TORQUE FOR EXPANSION COMPENSATOR

TYP Тип TYPE	MKG mkg	Nm	ft. lb
1 QC 13 QC	3,5	35	25
2 QC 33 QC	4	40	29
3 QC	4,5	45	33
4 QC	5	50	37
5 QC	5	50	37

Эл2-770-35-79, стр 1, всего 6стр.

INTERSTOP STOPINC AKTIENGESELLSCHAFT CH-6340 BAAR	ASSEMBLY AND TESTING DEVICE FOR EXPANSION COMPENSATOR	E 105125	
		DATE: FEB.89	PAGE: 2/6

Комплект для проверки устройства для расширения компенсатора

1. Assembly (Dissassembly) and Testing Device

Перевод на стр. 2а

Part No. : 101134
Drwg.No. : C101130

The device is used to test the required spring load so as for assembly and disassembly of the expansion compensator. All expansion compensators have to be tested according to the recommended periodical checks or after operational disturbances (see chapter 5). Fix the device to a solid base (e.g. working bench).

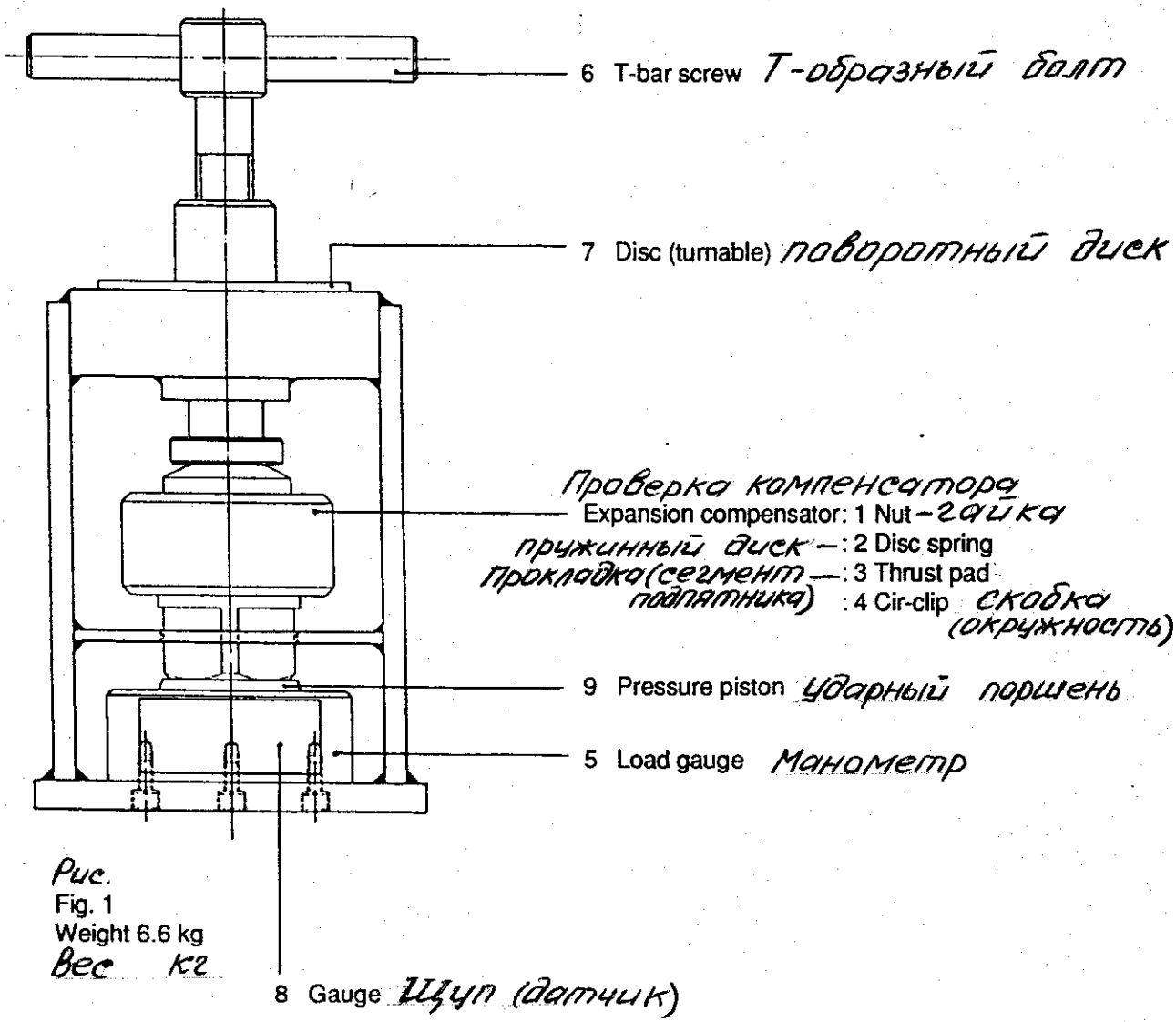


Рис.
Fig. 1
Weight 6.6 kg
Вес кг

NOTE : DO NOT OVERLOAD LOAD GAUGE !

Эп2-770-35-79 стр2

Установка (сборка)

2. ASSEMBLY

Компенсатор расширяющийся

Перевод на стр. 2а

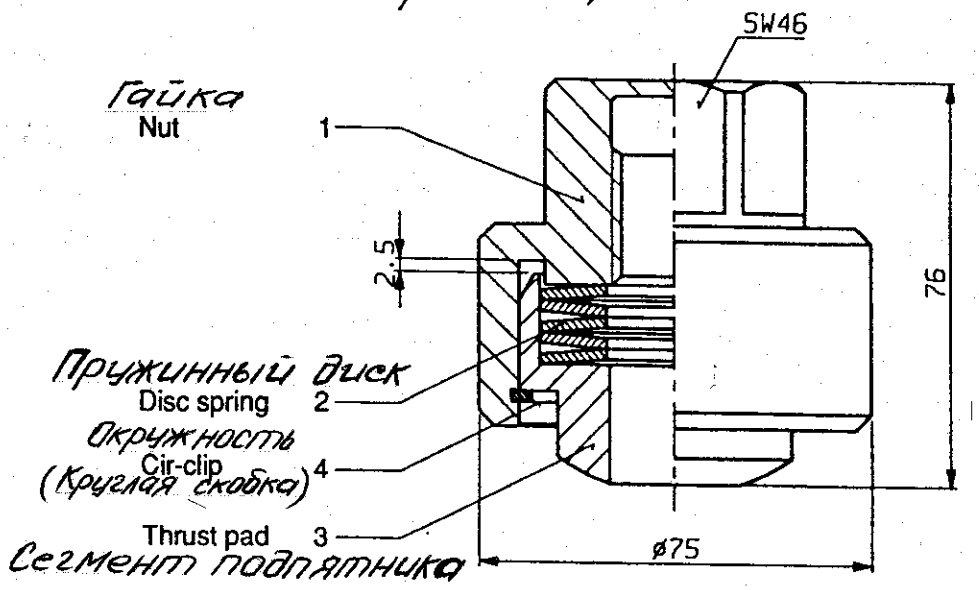


Fig.2

Примечание: все детали должны быть чистыми!

NOTE : ALL PARTS MUST BE CLEAN !

1. Put 5 disc springs (pos.2) into the thrust pad (pos.3). Note the position of each disc spring.

2. Set nut (1) over thrust pad (3) with the already 5 assembled disc springs.

3. Put cir-clip (pos.4) on nut (pos.1)

4. Set the pre-mounted expansion compensator on the pressure piston (pos.9) of the load gauge (pos.5) of the testing device.
   Note: Position of expansion compensator should be vertical as the pressure piston (pos.9) is loose jointed!

5. Press down thrust pad (pos.3) with T-bar screw (pos.6) in order to mount the cir-clip (pos.4) with a cir-clip pliers (Knipex, J31).

6. Loosen T-bar screw (pos.6).

Перевод на стр 4а

3.TESTING OF SPRING LOAD

NOTE : TEST EXPANSION COMPENSATOR IN COLD CONDITION ONLY !

By an expansion compensator spring deflection of 1.25 mm the load should be at least 300daN !

1. Set expansion compensator on the pressure piston (pos.9) of the load gauge (pos.5) Note: Position of expansion compensator should be vertical as the pressure piston (pos.9) is loose jointed!

2. Turn T-bar screw (pos.6) down until gauge indication shows 100daN. This is 0-position (measuring start position).

3. Then turn T-bar screw (pos.6) 180° further (= 1.25 mm deflection). Read load on gauge (pos.8). The turnable disc (pos.7) with a 180° segment (red) serves as a visual help.

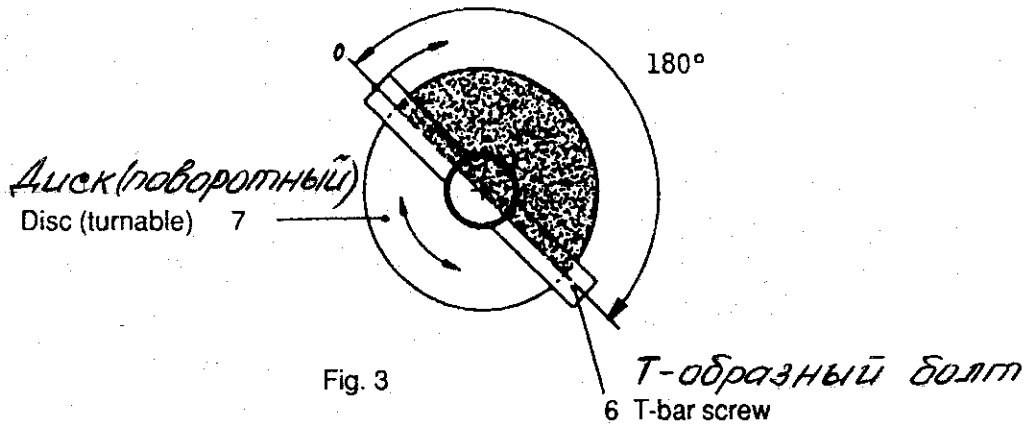


Fig. 3

THE LOAD MUST BE MIN. 300 daN

In case the load is less than 300daN, disassemble the expansion compensator and replace the 5 disc springs.

CAUTION : Do not mix 2mm and 2.25mm disc springs !

Эп2-770-35-79, стр 4

Перевод на стр. 5а

4. DISASSEMBLY

1. Set expansion compensator on pressure piston (pos.9) of the load gauge (pos.5). Note: Position of expansion compensator should be vertical as the pressure piston (pos.9) is loose jointed.

2. Press-down the thrust pad (pos.3) with the T-bar screw (pos.6) in order to dismount the cir-clip (pos.4) withthe cir-clip pliers (Knipex , J31).

3. Loosen T-bar screw (pos.6) , remove expansion compensator from load gauge (pos.5). Disassembly cir-clip (pos.4), thrust pad (pos.3) and disc springs (pos.2).

4. Clean all expansion compensator parts thoroughly. Reassemble the expansion compensator acc. chapter 1.

Эп2-770-35-79, стр. 5

Установка и проверка механизма

INTERSTOP STOPINC AKTIENGESELLSCHAFT CH-6340 BAAR	ASSEMBLY AND TESTING DEVICE FOR EXPANSION COMPENSATOR	E 105125	
		DATE: FEB.89	PAGE: 6 / 6

для расширения компенсатора.

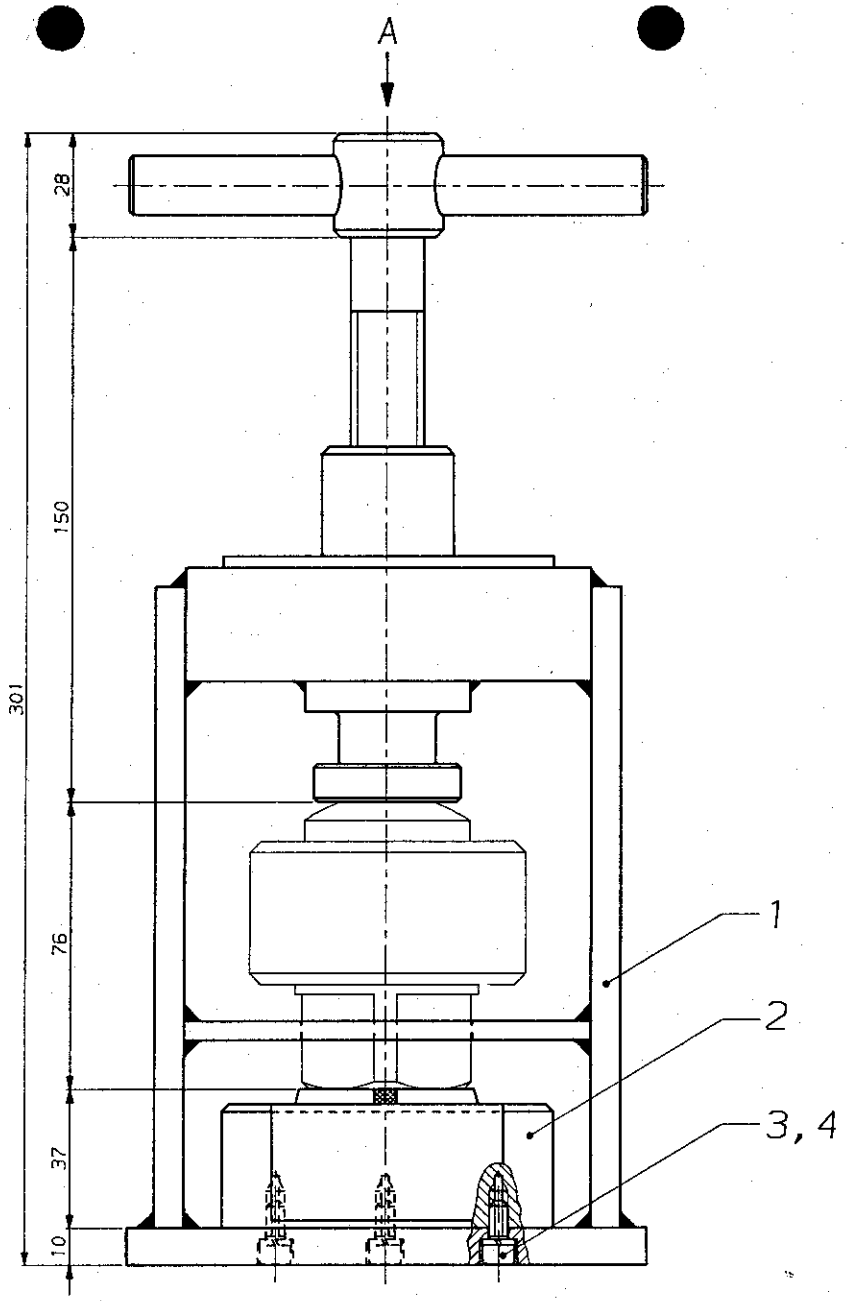
Техническое обслуживание

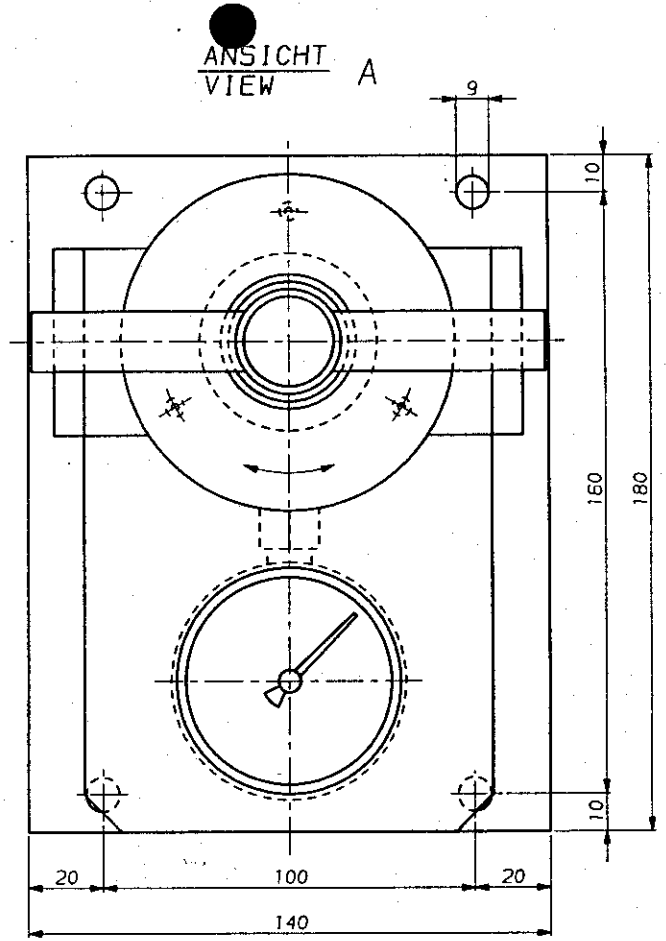
5. MAINTENANCE / PERIODICAL CHECKS (периодический контроль)

Контроль расширения компенсатора согласно главы 3
Test the expansion compensator acc. chapter 3.

a) For ladle gates : - after each ladle life or 30 casts
для шибера ковша - после 30 разливок

b) For tundish gates
для разливочного ковша
- by single heat — : - after 30 casts после 30 разливок (однораз. плавка)
- by sequence heat : - at every 4 tundish set-up
(при последова- на каждой 4 наладке
тельных плавках)





Стенд для испытания компенсатора Эл2-770-35-80

Контрольная установка

TEILENUMMER / PART NUMBER	101134
GEWICHT / WEIGHT	6.6

Ersetzt durch / Replaced by	-		
Ersatz für / Replacement for	C100952		
Massstab / Scale	1:1	Gezeichnet / Drawn	05-NOV-92 mc
		Geprüft / Checked	05-NOV-92 MQ

a	24-JUN-87	HUERLIMANN
b	06-NOV-92	MUELLER

WDK-MONTAGE U. PRUEFVORR. KOMPL.
ASSEMBLY AND TEST DEVICE
FOR EXPANSION COMPENSATOR COMPL.
-

INTERSTOP Stopinc Aktiengesellschaft CH-6340 BAAR

MICROFILM	FORMAT	NO.	INDEX
M	C	101130	b

Stopinc Aktiengesellschaft

Zugerstrasse 76a, Postfach 375, CH-6341 Baar ☎ (042) 333555, Fax (042) 31 28 64, Telex 862 128 ist ch

INTERSTOP

Спецификация к черт.

Order Parts List

стенда для испытания компенсатора

ASSEMBLY AND TEST DEVICE

FOR EXPANSION COMPENSATOR COMPL.

Part no.:	101134	Project no. 2014/419	Page : 1
Dwg no. :	C101130	ROKOP	Print : 09/06/95
kg/piece:	6.6		Issue : 04/04/95
			Doc no. : 8370

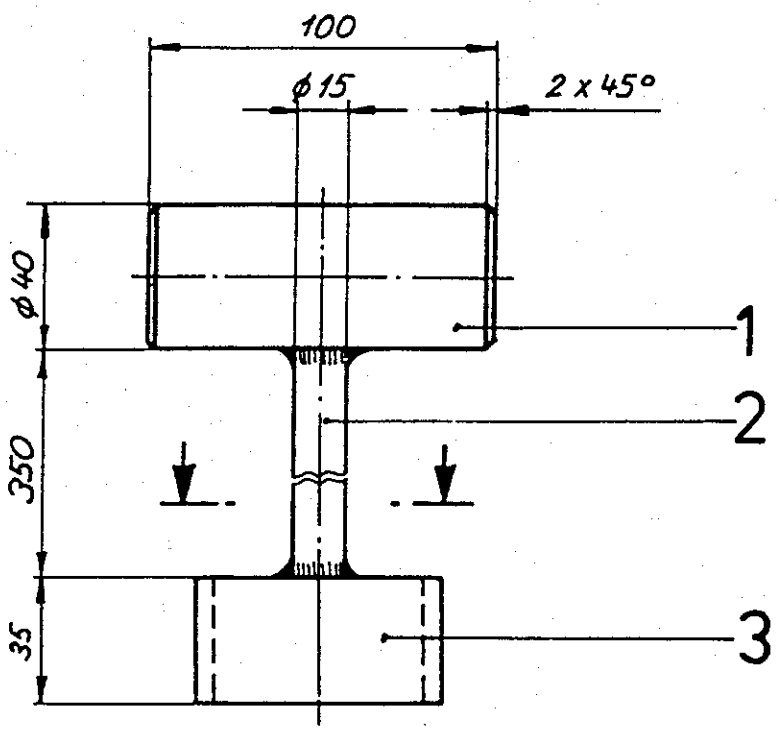
3100-018.FOE

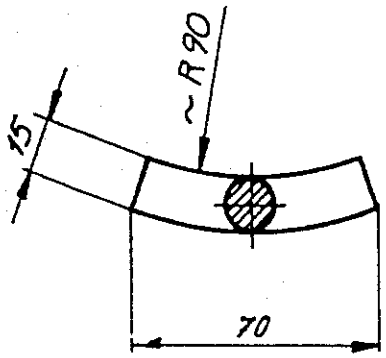
Pos.	Bg	Part no. / Designation	Dwg no.	Factor	Qty	Unit
						шт.
1	P	**112395**	C112394		1	pcs
		ASSEMBLY AND TEST DEVICE установка и контрольный				
		FOR EXPANSION COMPENSATOR механизм для расширения компенсатора				
2		**105644** динамометр			1	pcs
		DYNAMOMETER TYPE 1-1000 daN				
		CONNECTION 12 O'CLOCK включение 12 часов				
		WITH RUBBER PROTECTION с резиновым предохранителем				
3		**102145** винт гексагональной муфты			3	pcs
		HEXAGON SOCKET HEAD CAP SCREW M5X12				
		DIN 912-8.8 ДИН				
4		**102301** спрейерная моечная машина			3	pcs
		SPRING LOCK WASHER 5 DIN 7980				
		SPRING STEEL пружинная сталь				

End of list

Эп2-770-35-81 лист 1, всего 1

ITEM 50





Эл2-770-35-82

Вес
1,72 Kg

шт. листовая сталь Поз.

Stückzahl Quantity	Gegenstand Description	Pos. Item	Материал Material	Gewicht Weight	Modell Model	Bemerkung Remarks
1	Flachstahl 35 x 15 x 72	3	St 37	0,26		
1	круглая сталь Rundstahl ϕ15 x 350	2	St 35	0,48		
1	круглая сталь Rundstahl ϕ40 x 100	1	St 35	0,98		

PASSUNGSSYSTEM EINHEITSBOHRUNG H7 | FITTING TOLERANCE: BORING STANDARD H7

DIN 7168 mittel middle

Genauigkeit untolerierter Masse bei Längen bis mm / Out of tolerance accuracy for lengths in mm to

± →	3	6	30	120	315	1000	2000	4000	6000	12000	16000	20000
	0,1	0,1	0,2	0,3	0,5	0,8	1,2	2	3	4	5	6

Radien bis R mm / Radii to R mm

3	6	30	120	315
0,2	0,5	1	2	4

Winkel Angles

L–	10	50	120	120
	1°	30'	20'	10'

II | I

Ersetzt durch: .....
Replaced by: .....
Ersatz für: .....
Replacement for: .....

Massstab/Scale 1:2

Gezeichnet Drawn 5.9.85

Geprüft Checked

a 7.7.87		f	
b		g	
c		h	
d		i	
e		k	

Штамповочный инструмент
Stampfwerkzeug
Ramming tool

für Hülse / for nozzle для втулок

INTERSTOP Stopinc Aktiengesellschaft CH-6340 BAAR

L-14153.4

Index a

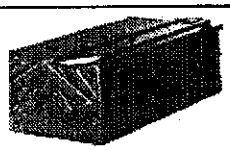
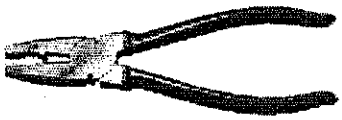
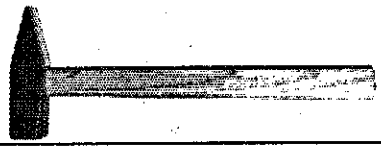
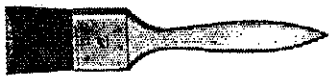
Перечень инструментов

INTERSTOP
STOPINC AKTIENGESELLSCHAFT
CH-6340 BAAR

WERKZEUGLISTE
TOOL LIST
LISTE D'ÔUTIL

13 QC

Date: 23.03.90 | Page: 1 / 2

STK PCS PCS	BEZEICHNUNG DESCRIPTION DESIGNATION Наименование	N детали TEILE NR. PART NO. NO. DE PIECE			
1	WERKZEUGKISTE Инструментал. ящик TOOL BOX CAISSE A OUTILS	106128			
1	SCHLOSS замок LOCK CADENAS	106129			
1	KOMBIZANGE комбинированные PLIERS COMBINATION плоскогубцы PINCE UNIVERSELLE	106135			
1	HAMMER 500 gr. молоток (500 г) HAMMER MARTEAU	106136			
1	FLACHMEISSEL 20 x 250 FLAT CHISEL плоская стамеска BURIN PLAT	106137			
1	DRAHTBUERSTE проволочная щетка WIRE BRUSH BROSSE METALLIQUE	106138			
2	FLACHPINSEL 63 mm Плоская кисть PAINT BRUSH FLAT PINCEAU PLAT	106139			
1	Кельма каменщика MAURERKELLE "KATZENZUNGE" L 160 mm SMALL MASON TROWEL "CAT TONGUE SHAPE" TRUELLE A BRIGUE	106140			
1	Кельма каменщика MAURERKELLE, VORNE ABGERUNDET, L 200 mm MASON TROWEL TRUELLE A BRIGUE	106141			
1	DREIKANTFEILE трехгольный напильник TRIANGULAR FILE LIME TRIANGULAIRE	106144			
1	FEILENGRIFF Ручка напильника HANDLE FOR FILE POIGNEE DE LIME	106145			

Stücklisten Nr.: 106259

Эл2-770-35-83, лист 1 всего 2

TOOL-LIS\13QC.PM3

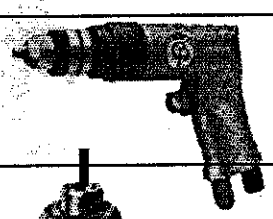
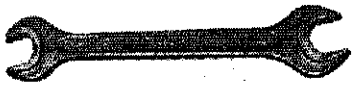
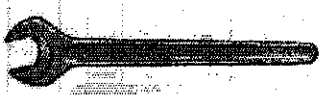
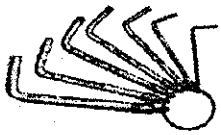
Перечень инструментов

INTERSTOP
STOPINC AKTIENGESELLSCHAFT
CH-6340 BAAR

WERKZEUGLISTE 13 QC
TOOL LIST
LISTE D'ÔUTIL

13 QC

Date: 23.03.90 | Page: 2 / 2

STK PCS PCS	Наименование BEZEICHNUNG DESCRIPTION DESIGNATION	Детали TEILE NR. PART NO. NO. DE PIECE			
1	Ручная бор/машинка сжатого воздуха DRUCKLUFT-HANDBOHRMASCHINE PNEUMATIC GRINDER PERCEUSE PNEUMATIQUE	106250			
2	щетка TOPFBUERSTE 309 STD SOCKET WIRE BRUSH BROSSE BOISSEAU	106251			
1	Железный рычаг HEBELEISEN GEKROEPFT, 400 mm CROW BAR PIED DE LEVAGE	106146			
1	тестер ROSTLOESER "BRANO-TECT", 400 gr CAN OF PENETRATING OIL DEROUILLEUR AEROSOL	106148			
1	Втулка BUECHSE MOLYCOTE FETT, 1 kg, CREDIMEX CAN OF MOLYCOTE GREASE BOITE DE GRAISSE MOLYCOTE	106149			
1	Вилкообразный ключ GABELSCHLUESSEL NW 41 / 46 WRENCH OPEN END CLE A FOURCHE	106147			
1	Вилкообразный ключ GABELSCHLUESSEL NW 14 / 17 WRENCH OPEN END CLE A FOURCHE	106836			
1	Вилкообразный ключ GABELSCHLUESSEL NW 19, WRENCH OPEN END CLE A FOURCHE	106837			
1	Защитные щипцы SICHERUNGSRINGZANGE "KNIPEX", J 31 PLIERS CIRCLIP PINCE A CIRCLIP	106252			
1	7-составной шестигранный шлицевт. ключ SECHSKANT STIFTSCHLUESSEL, 7-TEILIG, 2-8mm SET OF ALLENKEYS JEUX DE CLES MALES SIX-PANS	106131			

Stücklisten Nr.: 106259

TOOL-LIS\13QC.PM3

Эп2-770-35-83, лист 2

INTERSTOP®
STOPINC AKTIENGESELLSCHAFT
CH-6340 BAAR

Крутящий момент
TORQUE WRENCH
Гаечные ключи предельного момента

Data sheet
E 106102
Date : Sept.89 | Page : 1 / 1

Вид затвора Gate Type	Torque - wrench compl. Общий крутящий момент	Torque - wrench Pos. 1 Поз.	Переходная втулка Reducing socket Pos. 2 Поз.	Привод Socket drive Pos. 3 Поз.
1 - 2 QC 13 QC 33 QC	8 - 40 Nm 3/8" Drive Part No.: **105949**	8 - 40 Nm 3/8" Drive Привод Part No.: **105950**	Inside 3/8" Outside 1/2" Part No.: **105951**	Размер Size 46 1/2" Часть Part No.: **105952**
1 - 5 BKC	8 - 40 Nm 3/8" Drive Part No.:**106103**	8 - 40 Nm 3/8" Drive Привод Part No.: **105950**	Внутренняя сторона Inside 3/8" Outside 1/2" внешняя Part No.: **105951**	Size 41 Размер 1/2" Часть Part No.:**106108**
DS / DSV 110/65 DS / DSV 150/85 DS / DSV 190/110	10 - 120 Nm 1/2" Drive Part No.:**106104**	10 - 120 Nm 1/2" Drive Part No.:**106106**	Внутренняя часть Inside 1/2" Outside 3/4" внешняя Part No.:**106107**	Size 60 Размер 3/4" Часть Part No.:**106109**
3 - 5 QC	10 - 120 Nm 1/2" Drive Part No.:**106105**	10 - 120 Nm 1/2" Drive Part No.:**106106**		Size 46 Размер 1/2" Часть Part No.:**105952**

Позиция
Pos. 1

Эл 2 - 770 - 35 - 84

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Project No.: 2014/419

7. Refractories

7.1 Refractory Arrangement

7.2 Submerged Nozzle

7.3 Refractory Consumption

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8. Mai 1995/Wa

ROKOP, U.S.A.

Project No.: 2014/419

Tundish gate 13 QC

Refractory consumption for 30 heats (6 Strands)

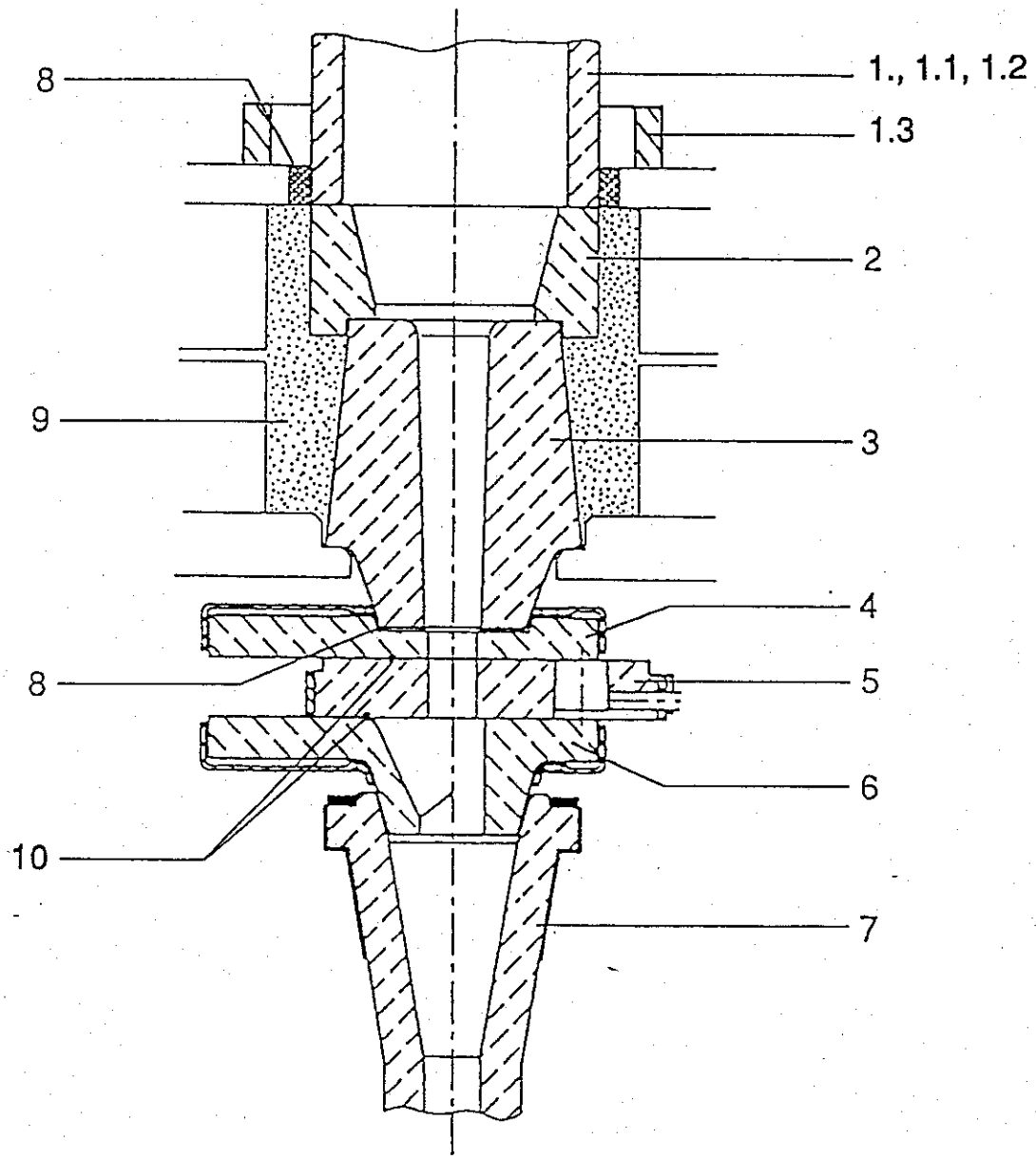
Pos.	Quantity (Pcs)	Item	Quality	Mod. No.	Dimension (mm)
1.	60	STARTERTUBE	Pyrostop Procast AH	D 247	H1=330 / H2= 250
1.1	60	STARTERTUBE	Pyrostop Procast AH	D 247	H1=380 / H2= 300
1.2	60	STARTERTUBE	Pyrostop Procast AH	D 247	H1=430 / H2= 350
1.3	180	STARTERRING	Pyrostop Procast AH	AT 1000	H=60
2.	180	NOZZLE TOP	Maxial 300 SV	6020	H=70
3.	100	NOZZLE	Dipermal K93 SV	6133	Ø 32/42
3.1	80	NOZZLE	Sanit C60S SV	AT 1201	Ø 32/42
4.	180	UPPER PLATE	Sanit 065-4 TTT ZSV	6318	Ø 30
5.	100	MIDDLE PLATE	Sanit 065-4 TTT ZSV	6316	Ø 30
5.1	80	MIDDLE PLATE	Zettral 95S ZSV	6316	Ø 30
6.	180	LOWER PLATE	Sanit 065-4 TTT ZSV	6320	Ø 40
7.	180	SUBM.NOZZLE	Grasanit 30K 681 ZRSV	Drawing No. D 117360	75/30 x 600

Morter and ramming mass

Pos.	Quantity (kg)	Item	Remarks
8.	100	RESITECT 190K SV	for joints
9.	4500	RESISTIT 631 SV	for nozzle and nozzle top
10.	10	SV - FINISH	Plate lubricant

Fn2-770-35-87 anem 2

INTERSTOP STOPING AKTIENGESELLSCHAFT CH-6340 BAAR	ROKOP, U.S.A.	FIG.



Эп 2-770-35-87, лист 3

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INTERSTOP

Customer : Red October via Rokop
Project No.: 2014/419

8. Operation

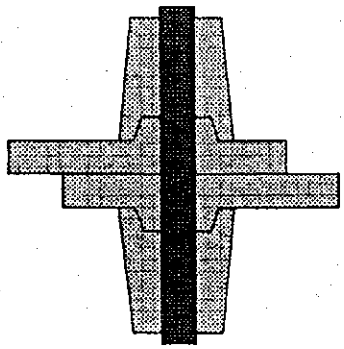
8.1 Operating Conditions prior to Start-up

8.2 Operation/Handling of Tundish Gate 13 QC

Эп 2-770-35-88, лист 1, всего 2

Operating Conditions prior to Start-up with Tundish Gates

20.4.93



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Telefon 042 / 33 35 55, Telex 862 128, Telefax 042 / 31 28 64

Fn 2-770-35-88 лист 2.

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Content

Технологическая инструкция по подготовке разливочного устройства к работе

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1. Preparation of Tundish

Note :
When gunning the tundish leave enough space for the starter tube. Provided space must be bigger than the starter tube outer diameter.

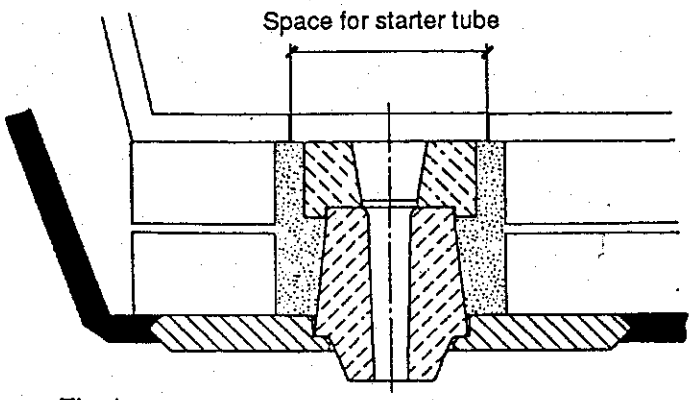

Fig.1

1.1 Setting of starter tube

Set the starter tube into the dry tundish and fill gap between gunning mass and starter tube with mortar.

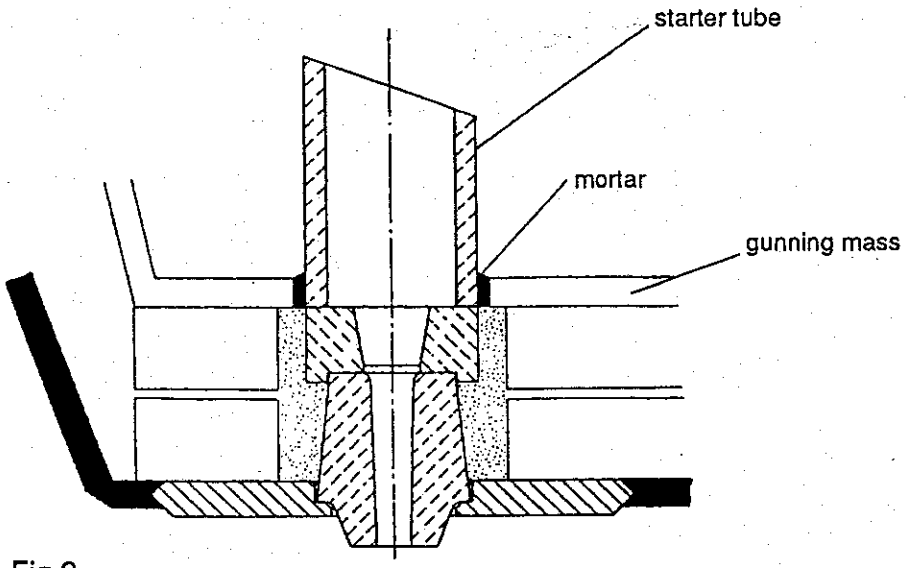

Fig.2

Jn2-770-35-89, item 2

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1.1.1 Special Start-Up Procedure

For steel qualities which require a good reoxidation protection (add cover powder into the tundish before start-up) use special start-up procedure.

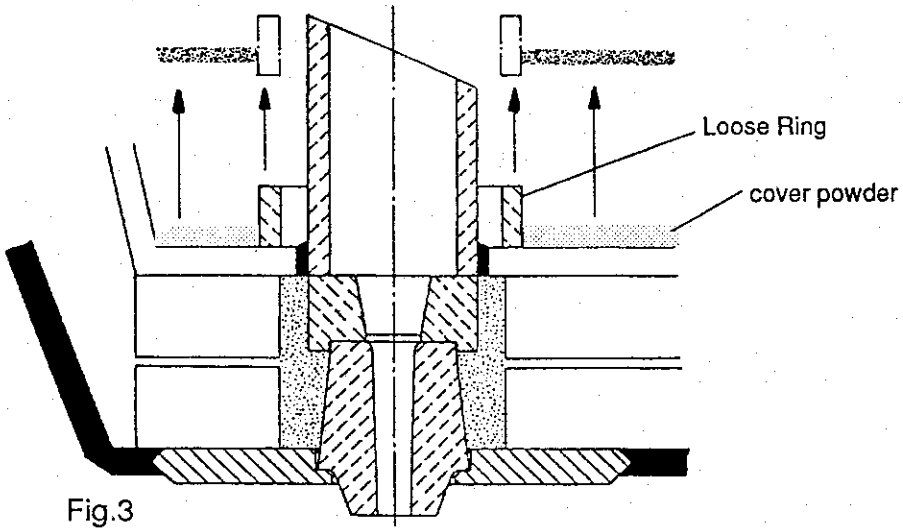
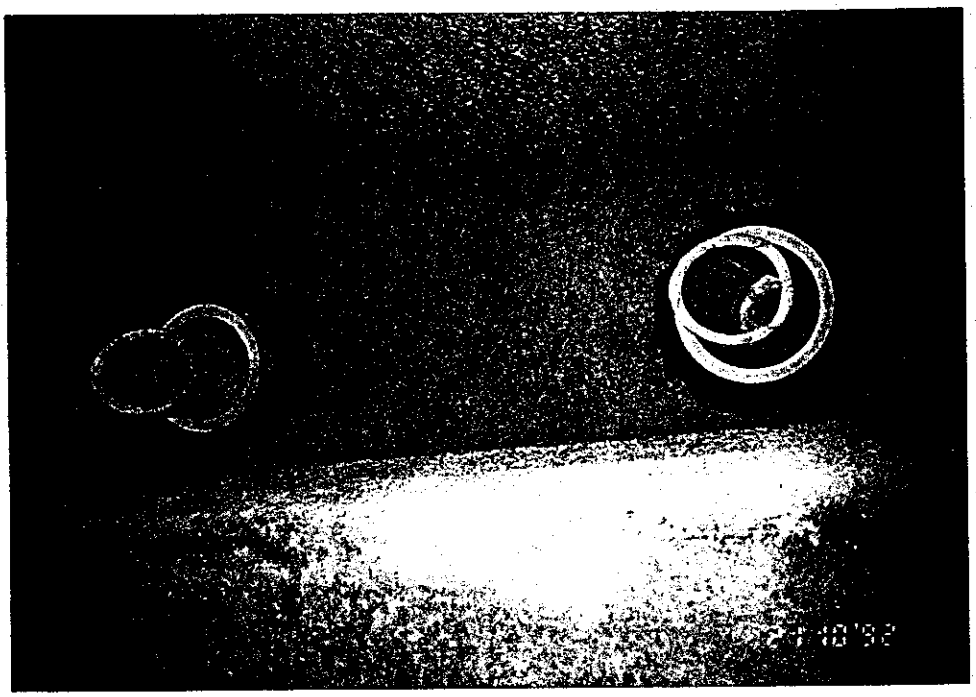


Fig.3

Put a loose ring (Pyrostop Procast HS) over the starter tube before pre-heating.
The loose ring keeps back the cover powder from entering the casting bore. The ring is floating with the rising steel bath level in the tundish.



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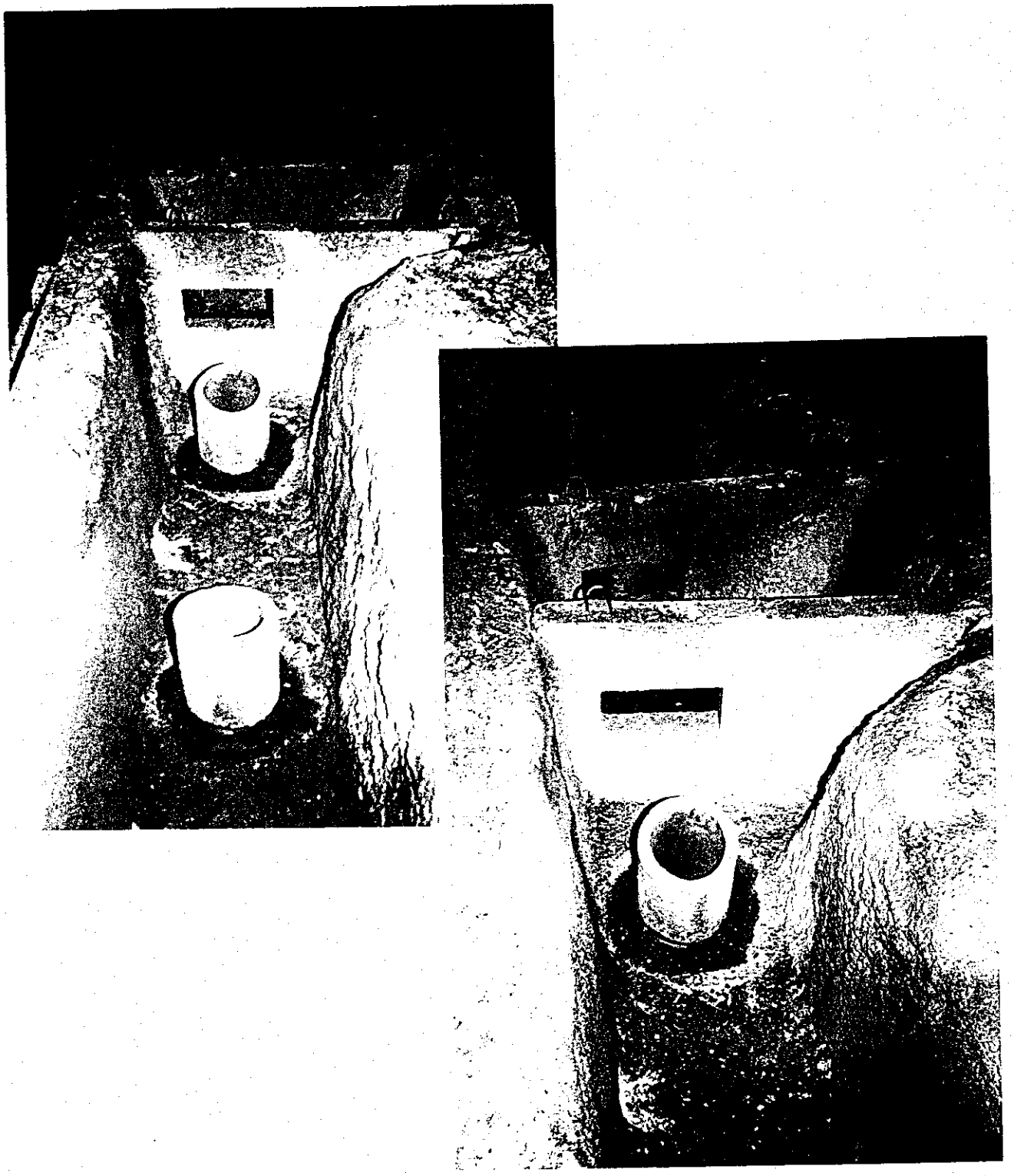
INTERSTOP

1.2 Dam system

A special dam system is recommended to reduce impact of liquid steel on to the starter tubes which could damage the tubes or even tip them over. This guarantees a safe start-up.



Zn2-770-35-89, лист4

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INTERSTOP

2. Preheating of casting bore and submerged nozzle (S/N)

To guarantee a safe start-up with the tundish gate a optimized preheating of the casting bore and submerged nozzle is essential.
The casting bore and the submerged nozzle must be preheated up to approx. **1000°C** for about **1 - 1 1/2 hours**

2.1 with cold tundishes

Preheat each strand with one burner centered over the casting bore (see fig.4). The burners should reach into the starter tubes. The premounted submerged nozzles will be preheated at the same time.
If necessary (e.g. not enough space) the submerged nozzles can be preheated in a separat preheating oven (see chapt.2.3).

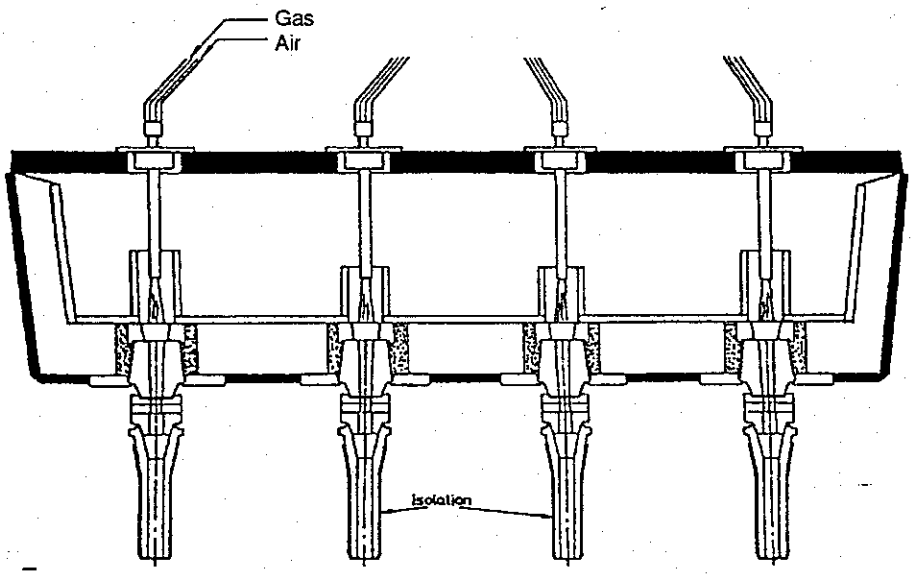

Fig.4
with submerged nozzles

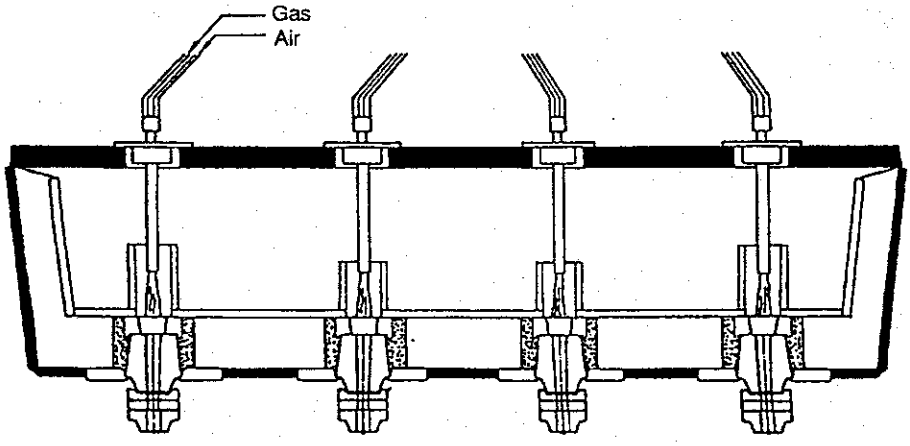

Fig.5
without submerged nozzles

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2.2 with warm / hot tundishes

Preheating of the tundish and casting bores with single burners from above. Each burner is centered in the cover of the tundish above the casting bore (Fig.6).The submerged nozzles have to be preheated separately (Fig.7).
In cases where the submerged nozzles are already mounted to the tundish gate, the submerged nozzles have to be preheated with additional burners from the bottom (Fig.8) or according the Venturi principle (Fig.9).

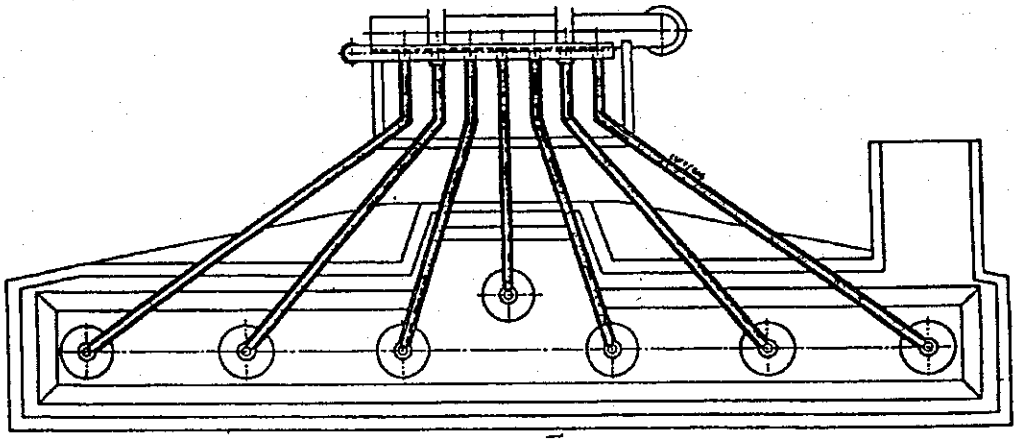

Fig.6
(view from above)

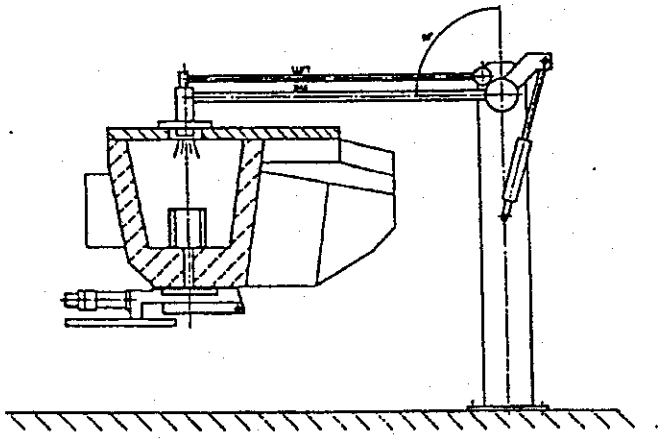

Fig.7

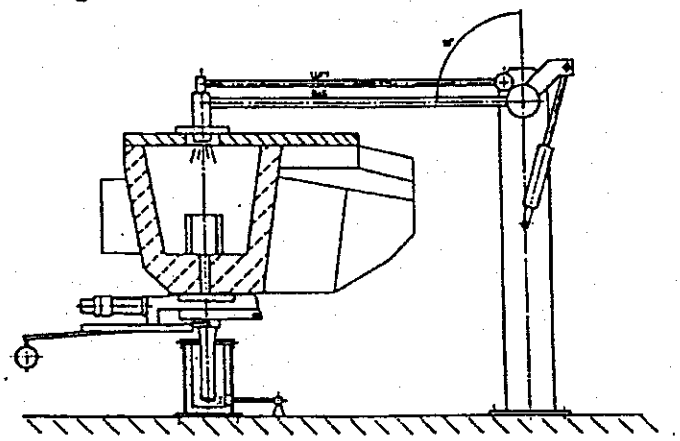

Fig.8

Эл2-770-35-89, лист 6

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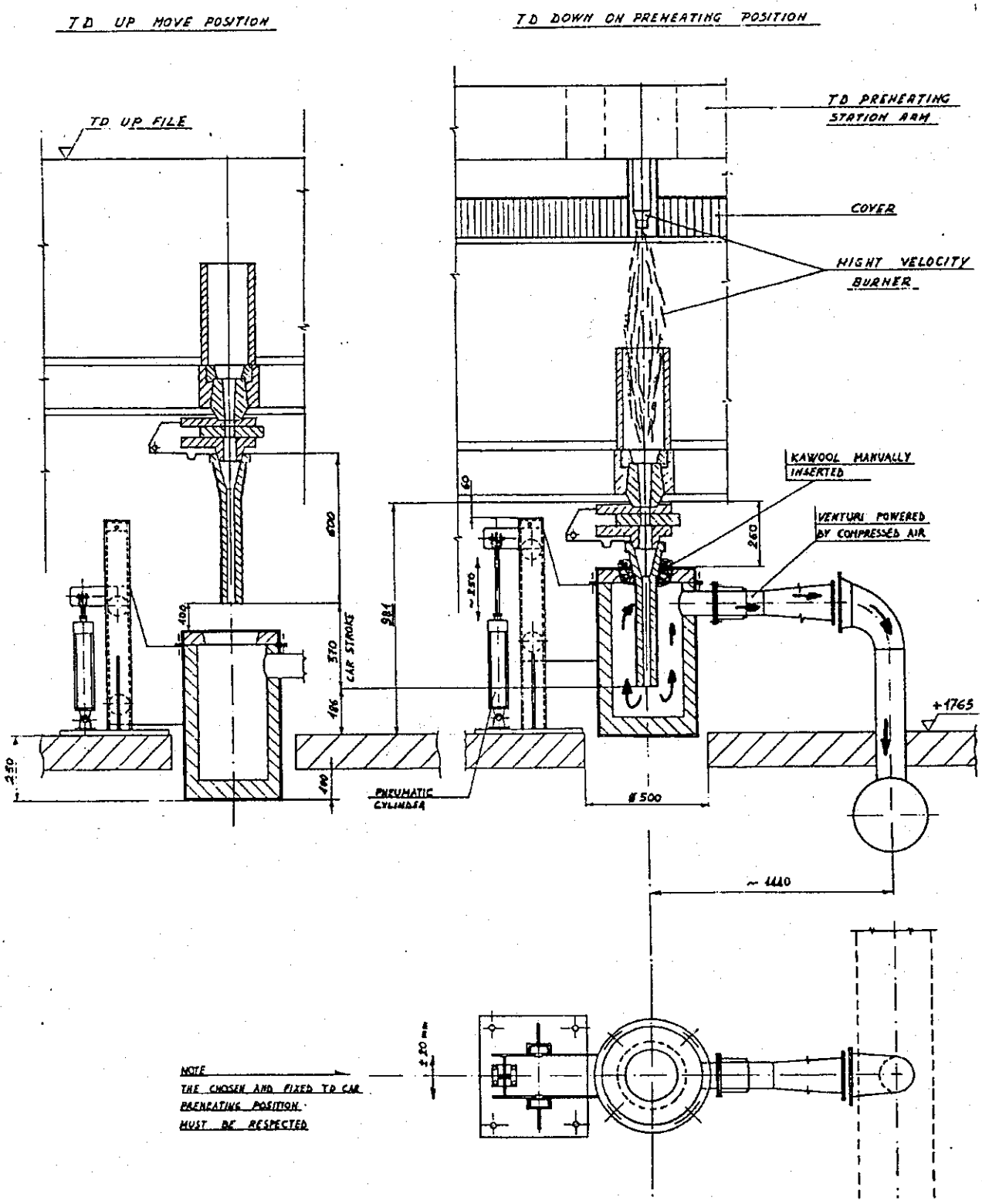
Fig.9
Venturi - Principle



Эл2-770-35-89, лист7

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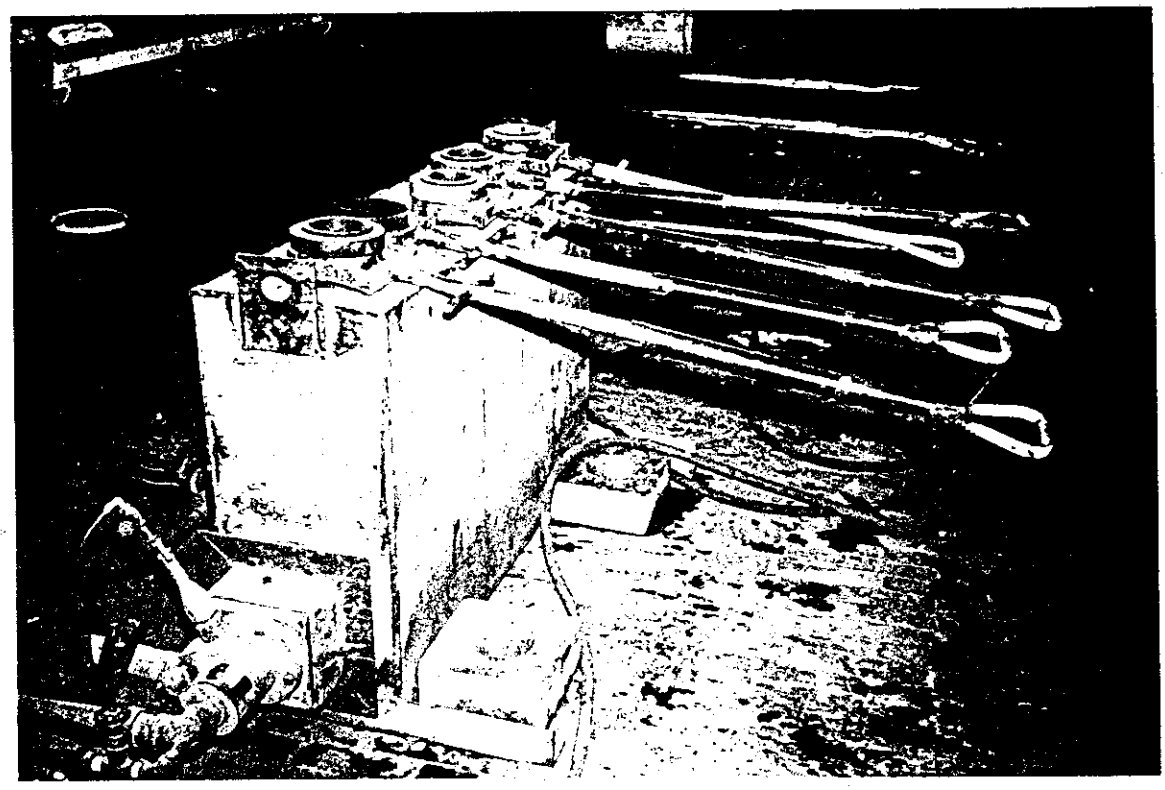
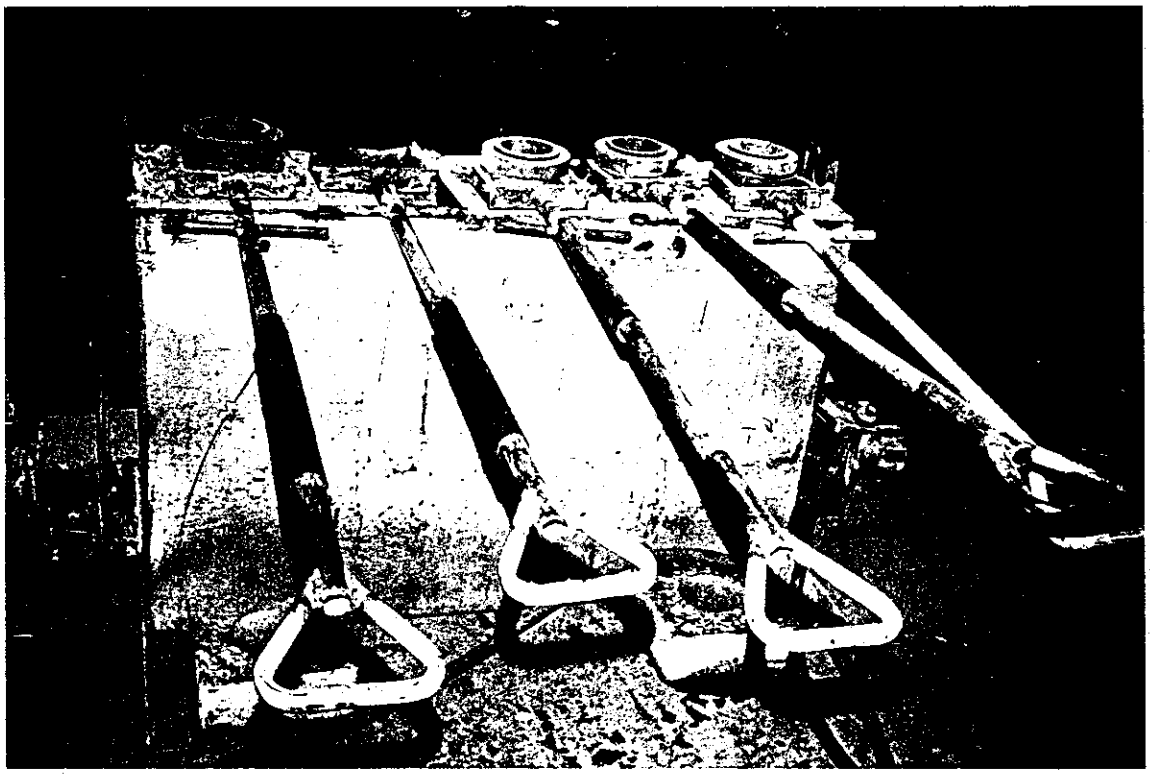
2.3 Submerged nozzle preheating stand

In cases where the submerged nozzles are separatly preheated a special oven must be provided.





Эл2-770-35-89, лист 8

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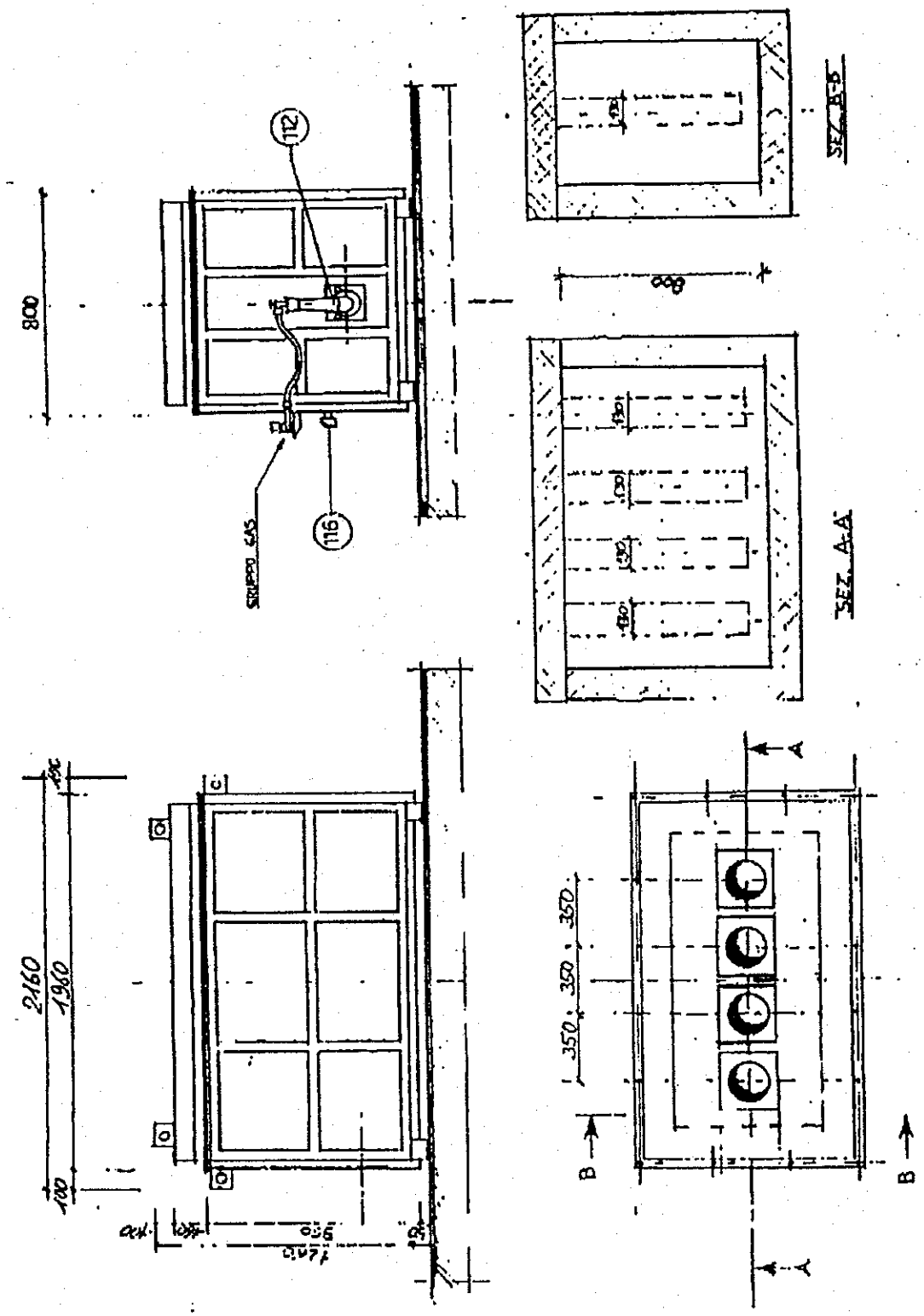

Fig.10

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INTERSTOP

3. Start - up procedure

The following conditions must be fulfilled to guarantee a safe start - up with the tundish gate:

Steel temperature of the first ladle in a sequence must be **30°C - 35°C** above liquidus, by following ladles **20°C - 25°C**

Ladle ready for teeming (ladle gate ready, shroud in position etc.)

Stop preheating (only if ladle is ready)

Move tundish car into casting position (as fast as possible in order to prevent temperature loss)

Delay between "stop preheating" and "start of CCM" **max. 5 minutes**

To avoid temperature loss and reoxydation of the steel cover the steel bath in the tundish with a good insulation powder (rice ash) as soon as the strands are started

Special start-up procedure see chapt.1.1.1

Fn 2-770-35-89, ncm 10

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INTERSTOP

From Stopinc AG recommended burner suppliers:

Adresse:

ELETTROTERMICA (ELTI)
Industriale s.n.c.
via Nationale
24060 - SOVERE (BG)
ITALY

Phone: 035 - 98 12 79
Fax: 035 - 98 15 55

CEBA
via Tonale 91
24061 Albano s. Alessandro
ITALY

Phone: 035 - 95 66 87
Fax: 035 - 95 66 71

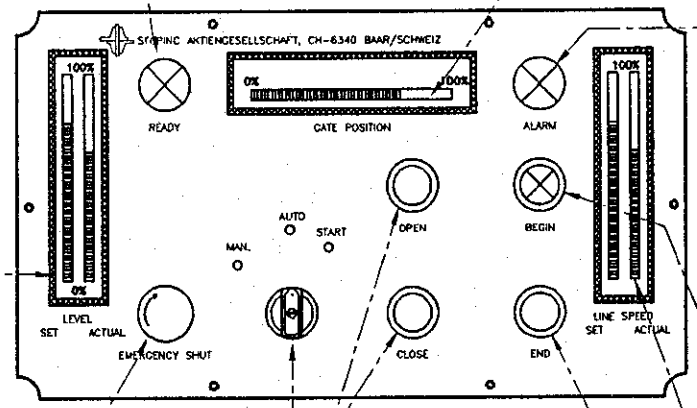
Эл2-770-35-89, лист 11

READY FOR CAST (READINESS LAMP) GREEN
Lights solid in case of: -System is ready for autom. operation after having initialized the start-up.
Flashes in case of: -System readyness for normal operation System pressure 180bar Emergency button not depressed.
-If emergency button gets depressed during auto mode or pressure drops <180bar.
Gets off in case of: -If emergency button gets depressed during start-up mode.
-Or pressure drops <180bar or line speed set is not within an accept-able limit.

LEVEL INDICATION
Left bar shows the set level and right bar shows the actual mold level.

TUNDISH GATE "OPEN/CLOSE" (BUTTONS) BLACK
Buttons for manual control of the tundish gate. (Activates the prop. valve).
Buttons are inactive if the system is in the start mode.
Auto control will be overrided by pressing either the OPEN or CLOSE button.
To get back on auto control, turn selector switch shortly to manual control and then bring it back to automatic control.

EMERGENCY SHUT (BUTTON) RED
While depressed, the gate closes in fast mode, PLC will be reset. Alarm lamp flashes until the EMERGENCY BUTTON has been unlocked.



TUNDISH GATE POSITION
Shows the actual cylinder position.

GENERAL ALARM (FAILURE LAMP) RED
Lights solid in case of: -Minor hydraulic problem, i.e. filter alarm, low pressure, high temperature etc.
Flashes in case of: -A serious hydraulic problem; i.e. pressure loss or excess temperature.
-An established emergency shut
-A serious electrical problem
-Activated overflow or breakout system.

CAST INTERRUPT BEGIN (INITIALIZING LAMP BUTTON) GREEN
Tundish gate will be closed in fast mode. Middle plate purging starts automatically. Strand stops automatically when the mould level drops to the >20% level of the Berthold measuring range. Lamp lights solid.

SPEED INDICATION
Left bar shows the set value for the withdrawal speed and right bar shows the actual withdrawal speed.

CAST INTERRUPT END (INITIALIZING BUTTON) BLACK
Tundish gate will be reopened. Automatic restart of strand and mould level control as soon as level controller has taken over, the lamp START will be off again.

MODE PRESELECTION (SELECTOR SWITCH WITH LED INDICATION)

MAN.-LED: Lights solid in case of: -System is in manual mode.
-Switch is in AUTO position but system still in start mode.
Gets off in case of: -Emergency shut has been initialized.
-System is in auto mode.

AUTO-LED: Lights solid if: -Auto mode has been activated.
Flashes in case of: -Switch is in AUTO position but system still in manual mode.
Gets off in case of: -Manual mode or
-Start conditiones have not been fulfilled (applies only for start phase), i.e. preset of line speed out of range, or hydraulic system not ready.

START-LED: Flashes as long as: -Berthold system calibration is actived
Lights solid if: -Berthold system calibration has been finished and the mould level is still empty.
Gets off if: -Start step has been fulfilled and auto mode has been reached (level >20% of Berthold measuring range).

Пульт управления типа BS-VS (поз.3)

Эл2-770-35-90

			DATE	8.11.90	STANDARD	STOPINC AG ZUGERSTRASSE 76A CH-6340 BAAR/SCHWEIZ	BEDIENUNGSSTATION VERTEILERSCHIEBER OPERATOR STATION TUNDISH GATE TYP BS-VS INHALTSVERZEICHNIS/COVERSHEET	ITEM 3
			DRAWN	Za				
			CHECKED	Al				
REVISION	DATE	NAME	NORM		ORIGIN / REPL.FOR	REPL.BY		E / E-09.11.90 / SHEET 1 / NEXT -

PUMP NO.3 (FAILURE LAMP) RED

Lights solid in case of a motor overload

PUMP NO.3 (LAMP INDICATING PUMP ON) GREEN

Should light solid as soon as the main switch is in ON-position.

PUMP NO.2 (FAILURE LAMP) RED

Lights solid in case of a motor overload or an automatic pump change.

PUMP NO.2 (LAMP INDICATING PUMP ON) GREEN

Selector button to switch pump on.

PUMP NO.1 (FAILURE LAMP) RED

Lights solid in case of a motor overload or an automatic pump change.

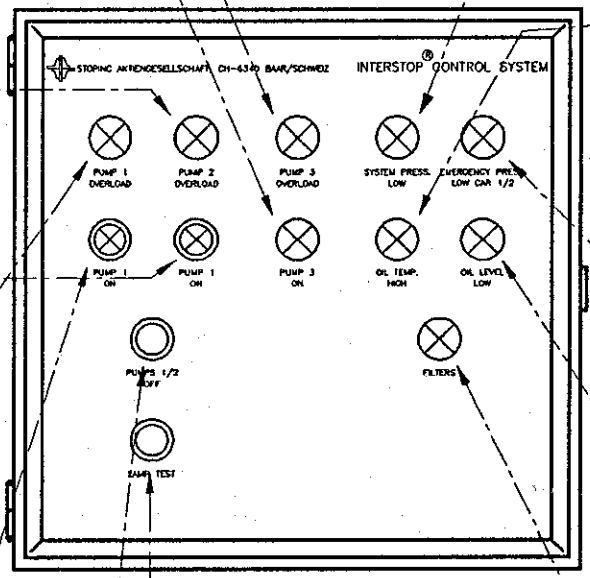
PUMP NO.1 (LAMP INDICATING PUMP ON) GREEN

Selector button to switch pump on.

PUMPS NO.1+2 (BUTTON TO SWITCH P1 OR P2 OFF) RED

LAMP TEST BUTTON YELLOW

If pushed all lamps should light solid.



SYSTEM PRESSURE LOW (ALARM LAMP) RED

Lights solid if system pressure drops <165-170bar (<2390-2465 P.S.I).

FLUID TEMPERATURE HIGH (ALARM LAMP) RED

Lights solid if fluid temperature in reservoir is >60°C. Flashes if fluid temperature in reservoir is >70°C. -automatic shut down of pump 1 or 2
-automatic shut of tundish- and ladle gates (ladle gates only if included in drive circuit.)

EMERGENCY PRESSURE (ALARM LAMP) RED

Indicates a pressure loss within the emergency accumulator on the tundish cars.

FLUID LEVEL LOW (ALARM LAMP) RED

Lights solid if fluid level in reservoir gets low. Flashes if fluid level in reservoir gets too low. -autom. shut down of pump 1 or 2
-autom. shut of tundish- and ladle gates (ladle gates only if included in drive circuit.)

FILTER CLOGGING INDICATION (ALARM LAMP) RED

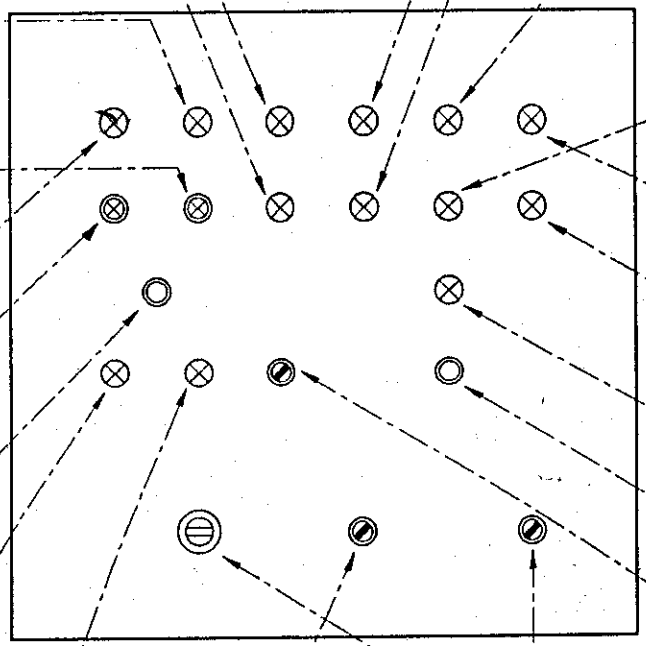
Lights solid as soon as one of the three filters on the central hydraulic unit (item 20) is contaminated.

типа BS-A01-A06

Пульт управления (поз 4)

Эл2-770-35-91

			DATE	05.11.90		STOPINC AG ZUGERSTRASSE 76A CH-6340 BAAR/SCHWEIZ	BEDIENUNGSSTATION ZENTR. HYDR. AGGREGAT OPERATOR STATION CENTRAL HYDR. UNIT TYP BS-A01-A06	ITEM 4	=
			DRAWN	Za					+
			CHECKED	Za				E	05119001
REVISION	DATE	NAME	NORM		ORIGIN / REPL.FOR	REPL.BY			SHEET / NEXT



PUMP NO.3 (FAILURE LAMP) RED
Lights solid in case of a motor overload

PUMP NO.3 (LAMP INDICATING PUMP ON) GREEN
Should light solid as soon as the main switch is in ON-position.

PUMP NO.2 (FAILURE LAMP) RED
Lights solid in case of a motor overload or an automatic pump change.

PUMP NO.2 (LAMP INDICATING PUMP ON) GREEN
Selector button to switch pump on.

PUMP NO.1 (FAILURE LAMP) RED
Lights solid in case of a motor overload or an automatic pump change.

PUMP NO.1 (LAMP INDICATING PUMP ON) GREEN
Selector button to switch pump on.

PUMPS NO.1+2 (BUTTON TO SWITCH P1 OR P2 OFF) RED

HEATER (LAMP INDICATING HEATER ON) GREEN
Lights solid as soon as the heating coil is operational
Fluid temperature <20°C = heater on
Fluid temperature >35°C = heater off.

COOLING WATER FLOW (LAMP INDICATING WATER ON) GREEN
Lights solid as soon as the water flow to the cooler has been released.
Fluid temperature >35°C = water flow on
Fluid temperature <35°C = water flow off

FLUID LEVEL LOW (ALARM LAMP) RED
Lights solid if fluid level in reservoir is low

FLUID LEVEL TOO LOW (ALARM LAMP) RED
Flashes if fluid level in reservoir is too low
Automatic stop of pumps 1 or 2
Automatic shut of tundish- and ladle gate

FLUID TEMPERATURE TOO HIGH (ALARM LAMP) RED
Flashes if fluid level in reservoir is >70°C
Automatic stop of pumps 1 or 2
Automatic shut of tundish- and ladle gate

FLUID TEMPERATURE HIGH (ALARM LAMP) RED
Lights solid if fluid temp. in reservoir is >60°C

SYSTEM PRESSURE LOW (ALARM LAMP) RED
Lights solid if system pressure gets <165-170bar

FILTER CLOGGING INDICATION (ALARM LAMP) RED
Lights solid as soon as one of the three filters on the unit is contaminoted

FLUID TEMPERATURE LOW (ALARM LAMP) RED
Lights solid if the fluid temp. in reservoir is <20°C

LAMP TEST BUTTON YELLOW
If pushed all lamps should light solid.

PUMP NO.3 (SERVICE KEY TO SWITCH PUMP OFF)
Can be used for service reasons to get pump 3 individually operational.
In normal cases pump 3 gets started automatically, as soon as the main switch is brought in ON-position.

MAIN SWITCH (SYSTEM ON/OFF)
To cut the motor and heater power supply

SPEED CONTROL / FLOW CONTROL

CAR IN CASTING POSITION

Пульт управления типа EST-A02 (п0320)

Эл2-770-35-92

a	25.01.95	Vo	DATE	18.09.90		STOPINC AG ZUGERSTRASSE 76A CH-6340 BAAR/SCHWEIZ	ZENTRALES HYDRAULIK AGGREGAT CENTRAL HYDRAULIC UNIT TYP EST-A02	ITEM 20	=
			DRAWN	Za					+
			CHECKED	Za				E	06119001
REVISION	DATE	NAME	NORM		ORIGIN / REPL.FOR	REPL.BY			SHEET / NEXT

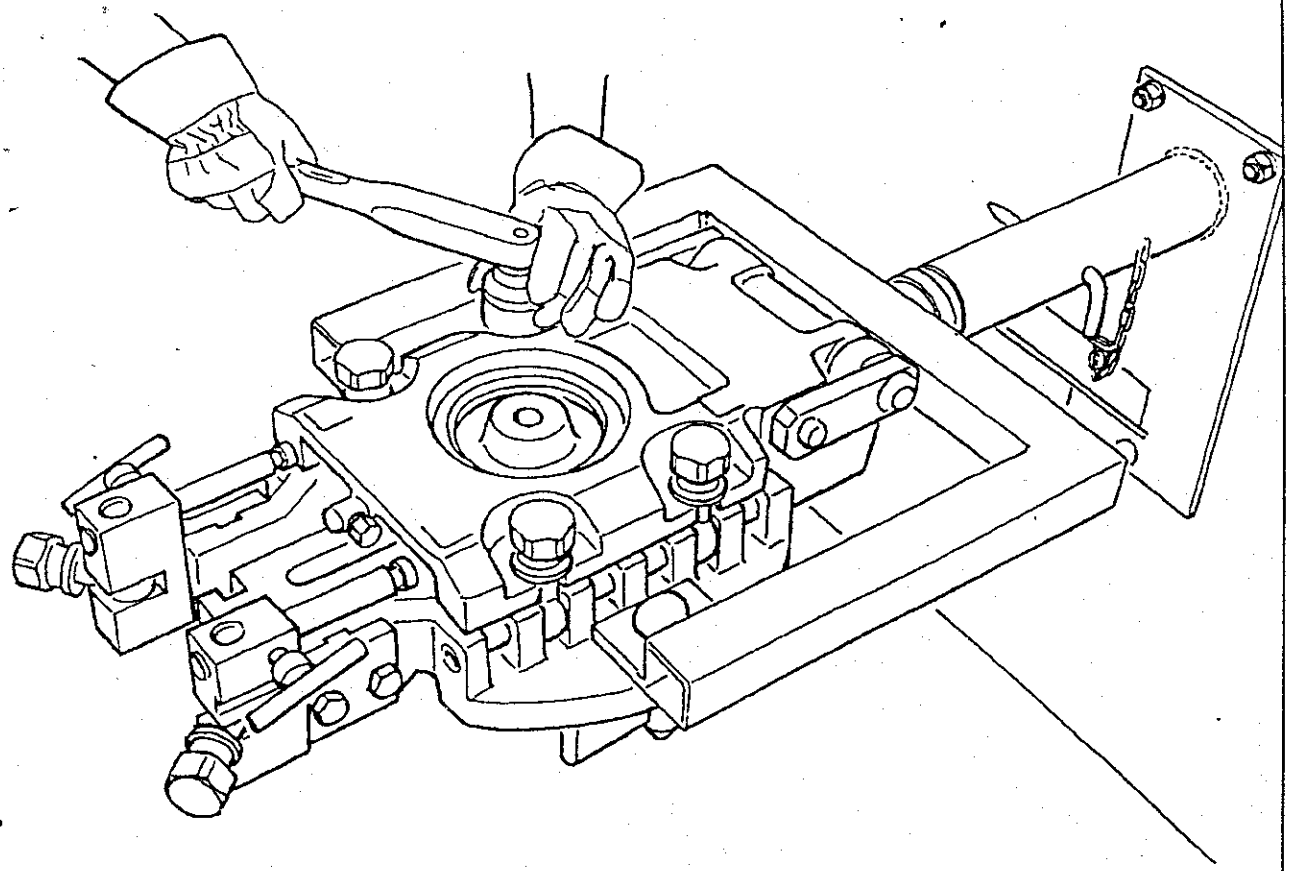
Инструкция по монтажу узла бесстопорной разливки стали для разливочного устройства типа 13 QC.

INTERSTOP®

Tundish Gate Type 13 QC

Offline Assembly

INSTRUCTION MANUAL



Oct. 1988
A 11.01e

Эп2-770-35-93

Stopinc Aktiengesellschaft, Postfach, CH-6340 Baar, Switzerland, Telephone 042/333´555

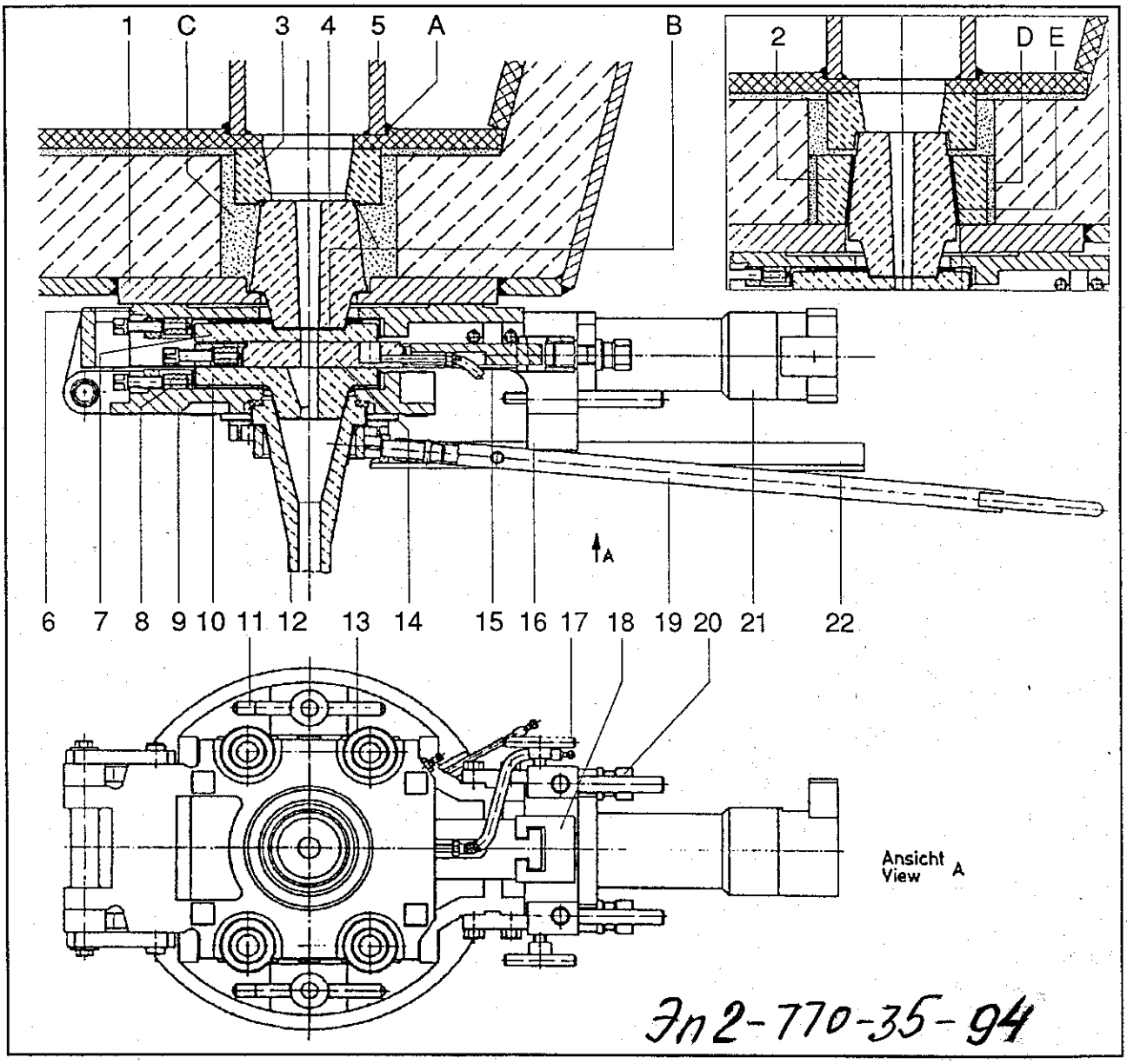
Tundish Gate Type 13 QC

Узел бесстопорной разливки стали, разливочного устройства типа 13. Q.C

1 Welding plate
2 Well block
3 Nozzle-top
4 Nozzle
5 Starter tube (PROCAST S)
6 Housing
7 Upper plate
8 Clamping bar
9 Cover
10 Lower plate
11 Wedge
12 Pouring tube (P.T.)
13 Cover nut
14 Middle plate
15 Middle plate frame
16 Cylinder support
17 T-bar screw
18 Coupling claw
19 Pouring tube holder
20 Eye bolt
21 Stroke measuring cylinder
22 Guiding rail

Refractory mortar:

A BLAKITE SV
B RESITECT 190 K SV
C Special ramming mass
D COMPRIT 70 SV
E DURAMUR 70 SV



Эл2-770-35-94

Технологический процесс монтажа шиберного затвора и огнеупоров бесстопорной разливки стали для разливочного устройства 13QC

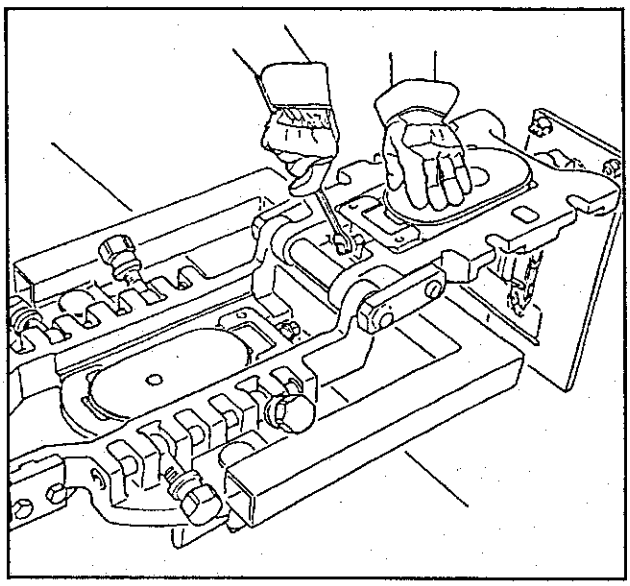
3

Operation Manual

Offline Assembly

нелинейная установка

ручное управление



Эп 2-770-35-95,

Oct. 88

A 11.01/3.01e

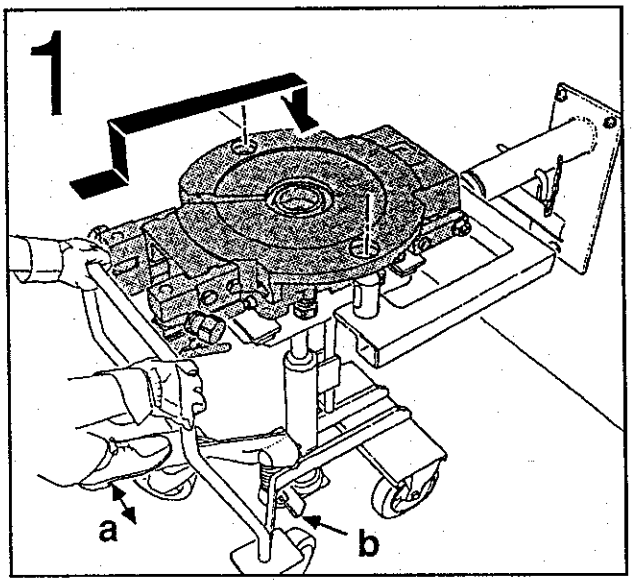
лист 1,

всего листов 25

Промежуточное разливочное устр-во (схема)

3.1 Tundish Gate Assembly

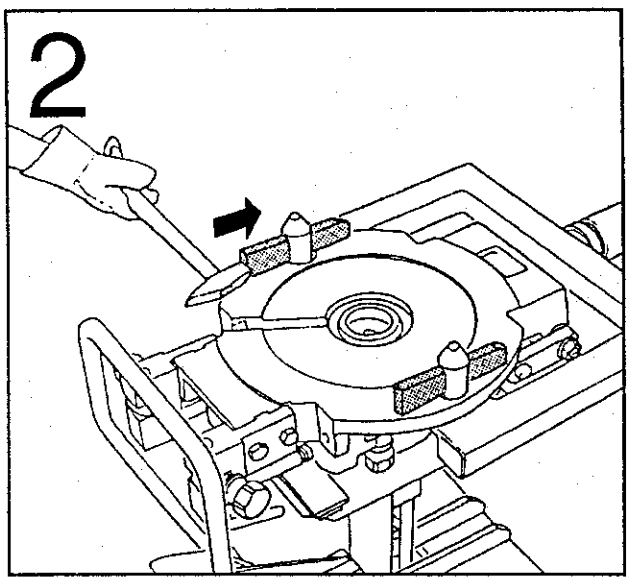
Схема вращения устр-ва в комплекте с тележкой и штативом.



Move tundish gate with assembly car to assembly rack.

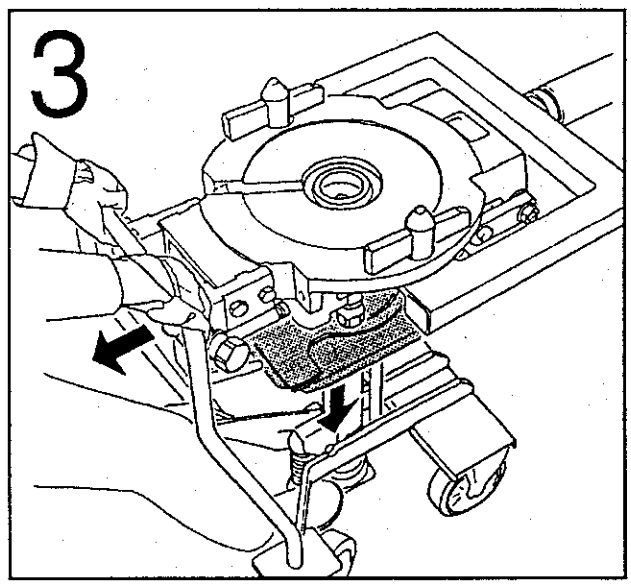
Lift tundish gate (a) and position it over the two center-pins and lower it (b).

Схема подъема устр-ва (а) и позиция на 2х центрирующих штативах и его опускание.



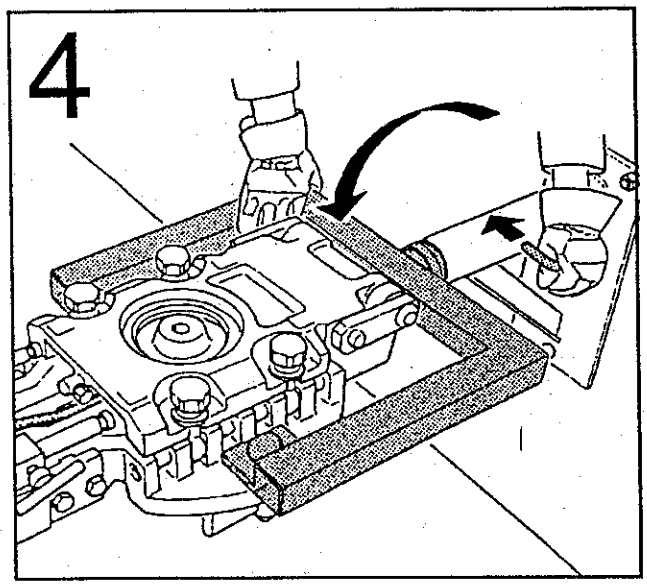
Fix tundish gate with the two wedges.

Схема фиксирования устройства двумя клиньями



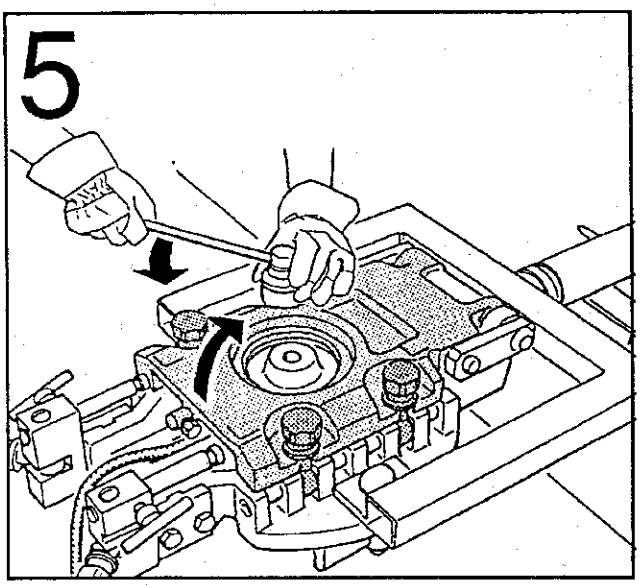
Lower lifting table and move assembly car away.

Снижение подъемного стола и передвижение тележки



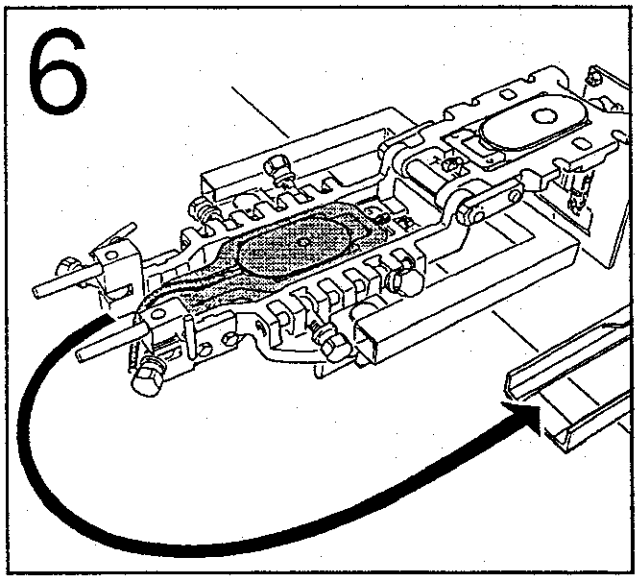
Turn assembly rack 180° and fix it with locking pin.

Поворот устр-ва на 180° и фиксирование его стопорными штифтами.



Loosen all four cover nuts and open the cover.

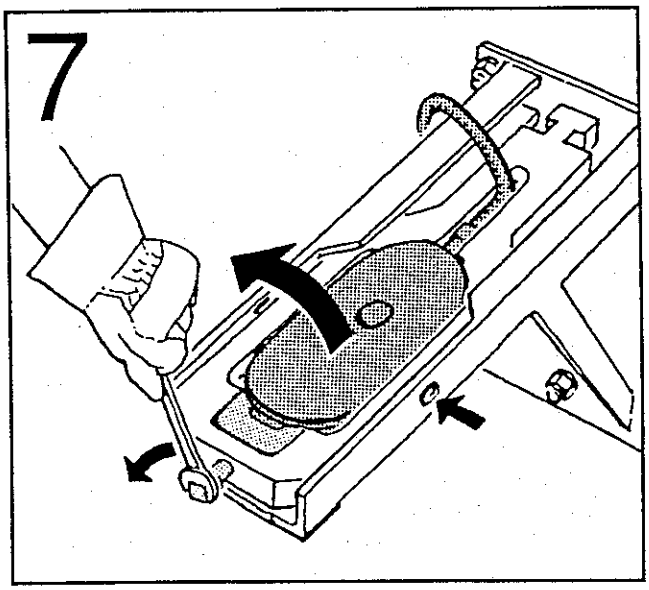
Отпустить и снять все 4 колпачковые гайки.



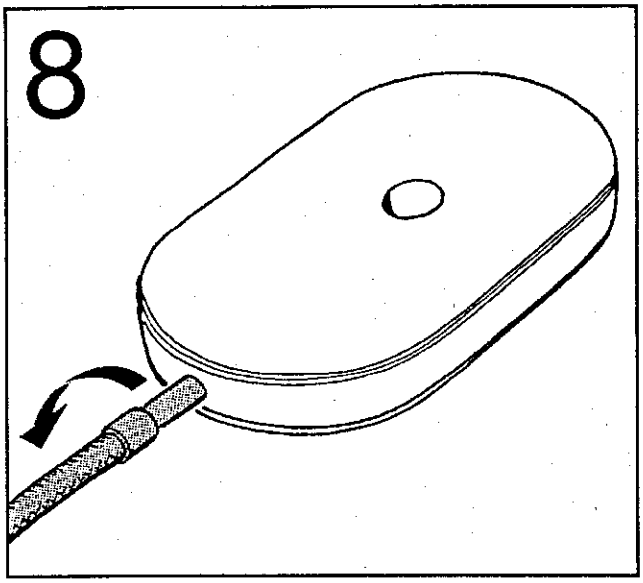
Remove middle plate and frame and place it into holding device.

Снятие средней плиты, рамы и размещение ее в крепежном устройстве.

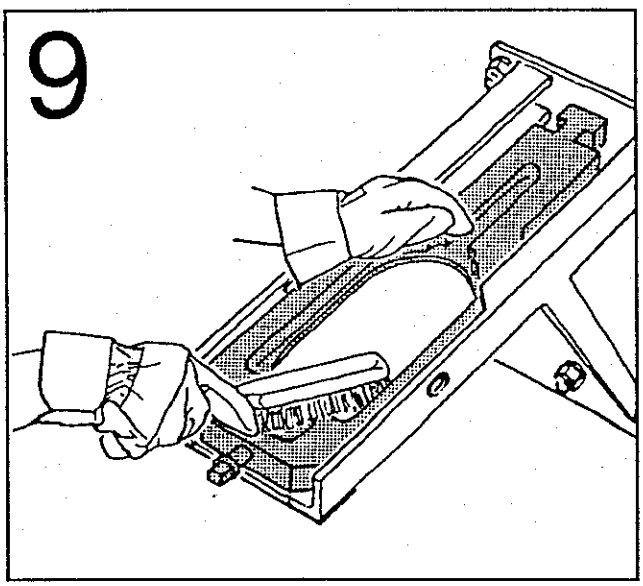
Эп2-770-35-95, лист 3



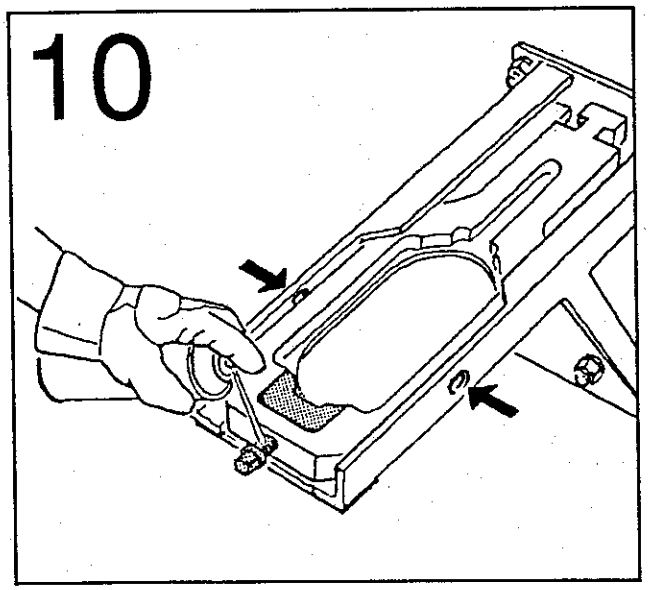
Loosen clamping bar and set screws on both sides and then remove refractory plate.
Отпуск зажимного бруска и комплекта винтов на обеих сторонах и смещение огнеупорной плиты.



Unscrew gas hose – discard used refractory plate.
Отвинчивается газовый шланг и убирается огнеупорная плита.

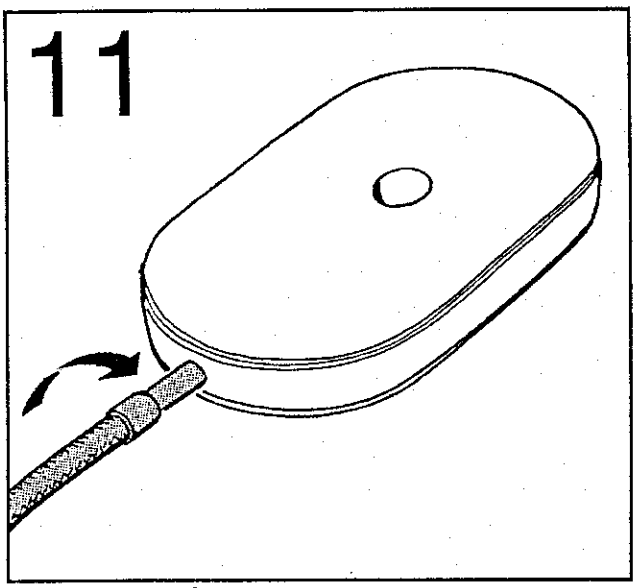


Clean frame.
Чистка рамы.



Spray penetrating oil onto the clamping bar, bolt threads and set screws to allow easy movement.

Выпрыскивание масла в зажимной брусок, нарезные болты и комплект винтов в нужный момент.

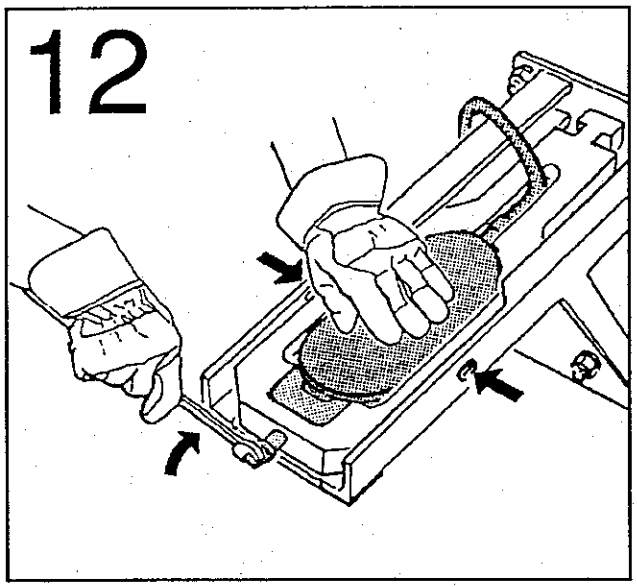


На газовом шланге туго закрепить среднюю плиту.

Screw on gas hose tight to new middle plate.

CHECK: Tightness of connection with air pressure.

Контроль: герметичность соединения с воздушным прессом.



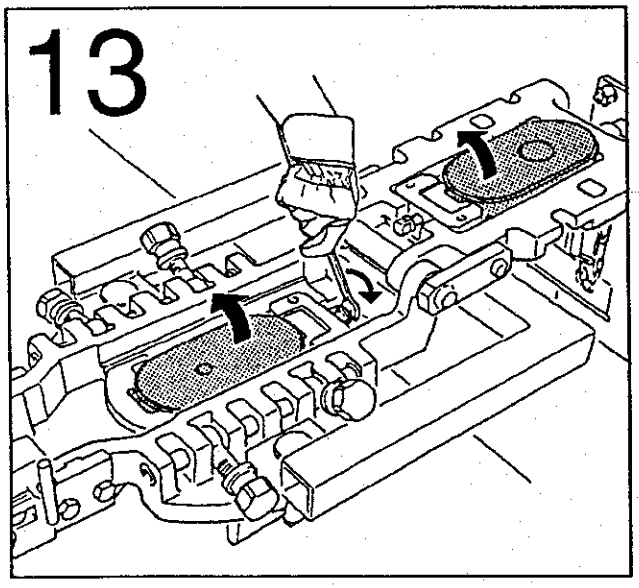
Put middle plate into frame and press it against bearing surface. Secure it with clamping bar and set screws (slightly)

CAUTION: Plate must be placed properly on bearing surface and may not lift-off after fixing with clamping bar.

Положите среднюю плиту в раму и нажмите на опорную поверхность. Надежно закрепите её крепежными брусками и комплектом болтов.

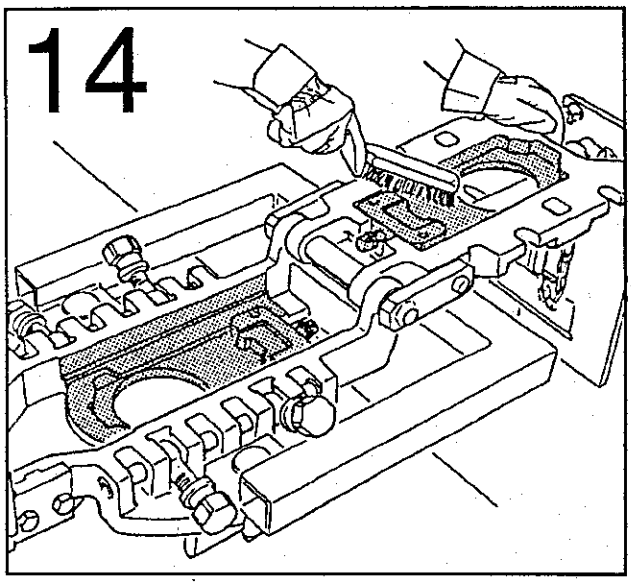
Осторожно:
Плита должна правильно размещаться на опорной поверхности и не подниматься после фиксации крепежными брусками.

Эп2-770-35-95, лист 5



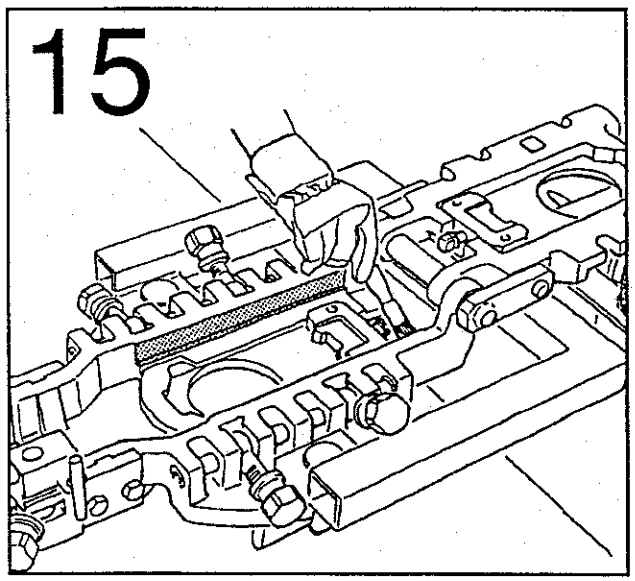
Loosen clamping bars in housing and cover – remove used refractory plates.

Отпустить крепежные бруски на раме и закрыть (удалить) огнеупорную плиту.



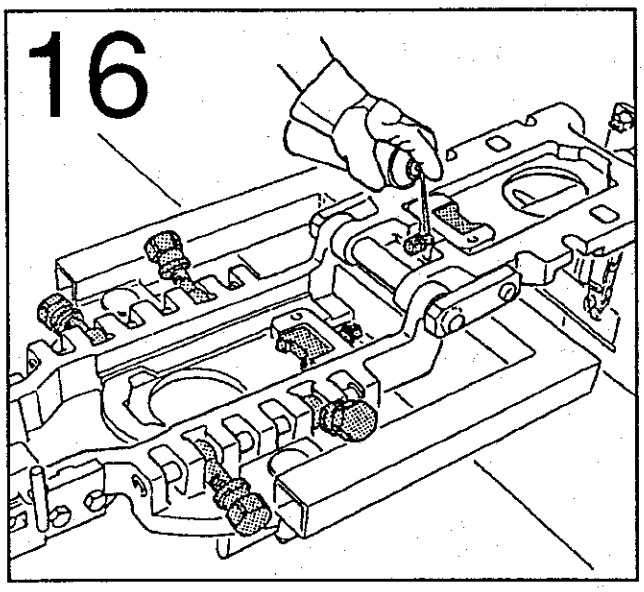
Clean tundish gate.

Почистить шибер промежуточного разливочного устр-ва.



Apply lubricant resistant to high temperatures on sliding surfaces.

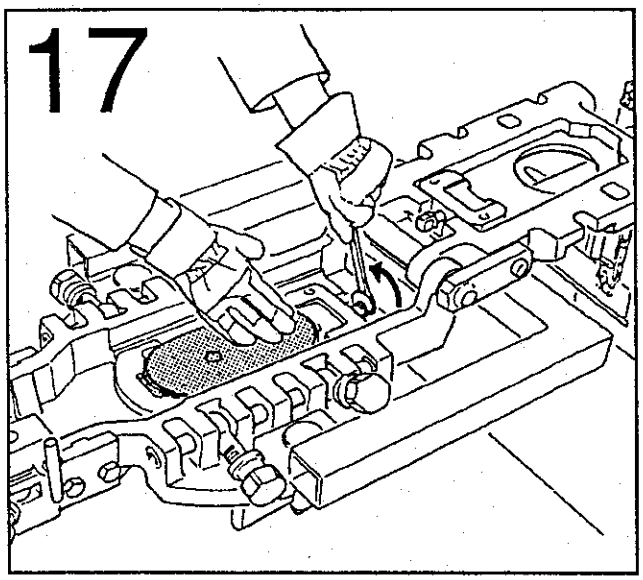
Применять стойкую смазку при высоких температурах для скользких поверхностей.



Spray penetrating oil onto cover nuts, clamping bars and clamping bar bolts in housing and cover to allow easy movement.

Впрыскивать масло на головки гаек, крепежные брусы и болты на раме (станине) – при необходимости.

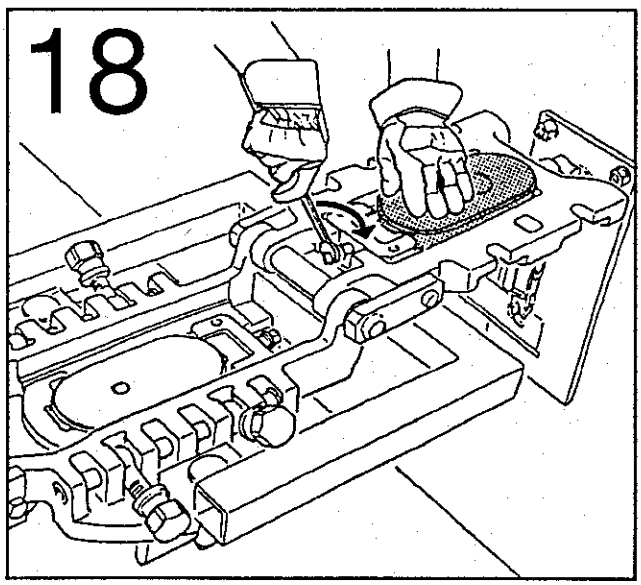
Вставить новые верхние плиты в кожух, прижать опорную поверхность и закрепить крепежными планками.



Set new upper plate into housing, press it against bearing surface and secure it with clamping bar.

CAUTION: Plate must be placed properly on bearing surface and may not lift-off after fixing with clamping bar.

Осторожно: плита должна располагаться на специальной опорной поверхности и не отставать после фиксации крепежными планками.

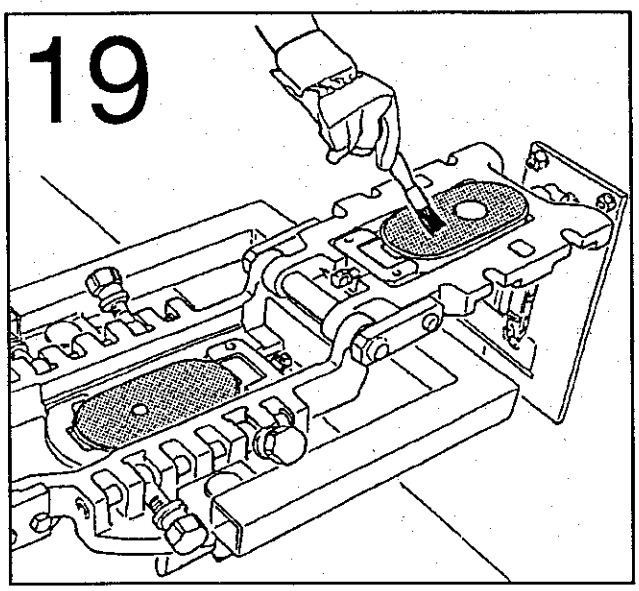


Set new lower plate into cover, press it against bearing surface and secure it with clamping bar.

CAUTION: Plate must be placed properly on bearing surface and may not lift-off after fixing with clamping bar.

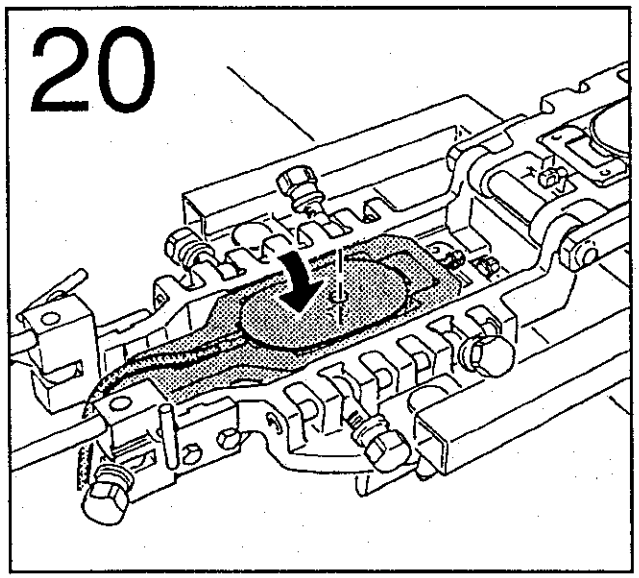
Опустить новые плиты в углубление, прижать опорную поверхность и закрепить крепежной планкой.
Внимание: плита должна располагаться на опорной поверхности и не отставать после крепления крепежными планками.

Эп2-770-35-95 лист 7



Apply oil graphite mixture onto upper and lower plate surface.

Применяется смазка, содержащая графит, для поверхности нижней плиты.

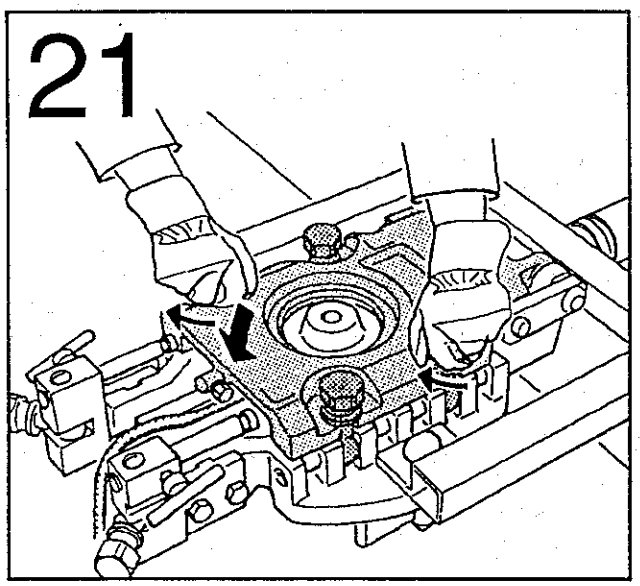


Set pre-mounted middle plate – aligning of casting bores – into housing.

Набор монтажной средней плиты – расположить вдоль внутри корпуса (рамы).

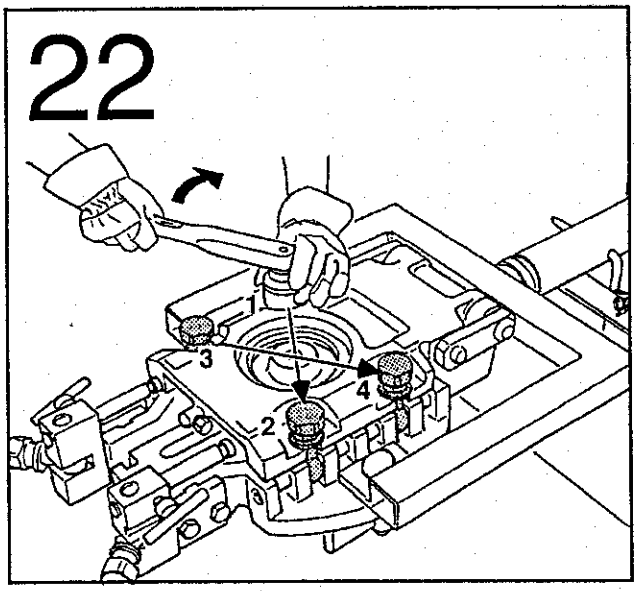
Закрыть кожух.

Close cover.



Tighten cover nuts manually. Diagonal order. Закрутить вручную гайки в последовательном порядке.

Эл2-770-35-95, лист 8



Tighten cover nuts step by step with torque wrench.*
Observe order.

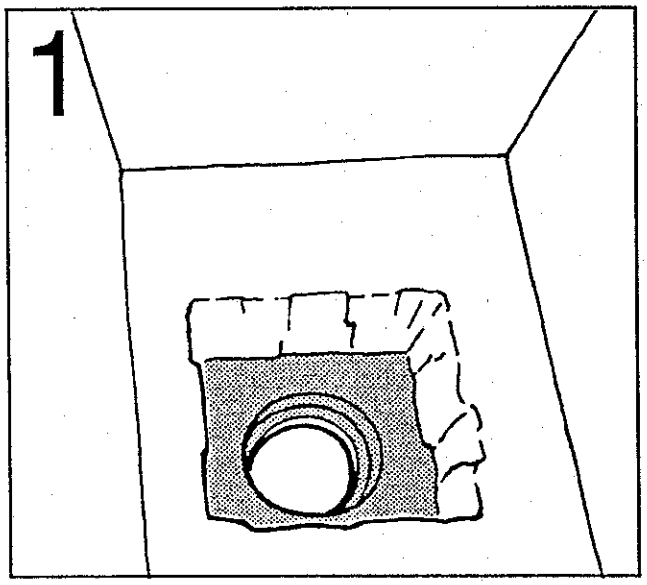
*Torque: 25 ft.lb.
35 Nm (3,5 mkg)

Постепенно затянуть гайки круговыми движениями.

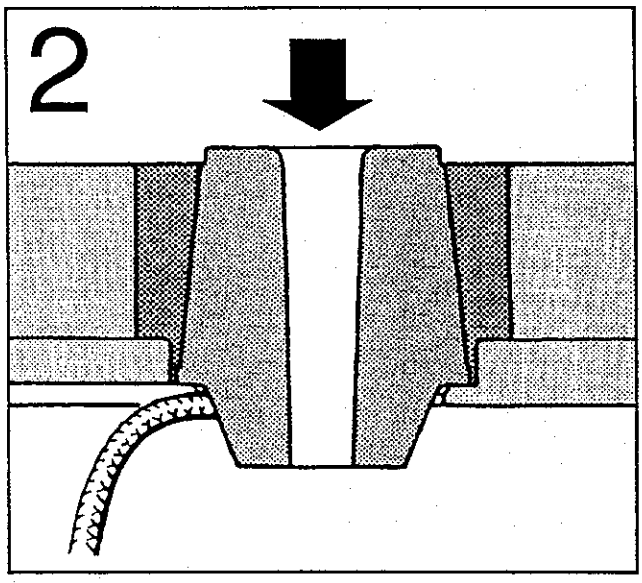
Эл2-770-35-95, лист 9

3.2 Tundish Preparation

If nozzle is set from top:



Clean nozzle bearing surface and tundish bottom.

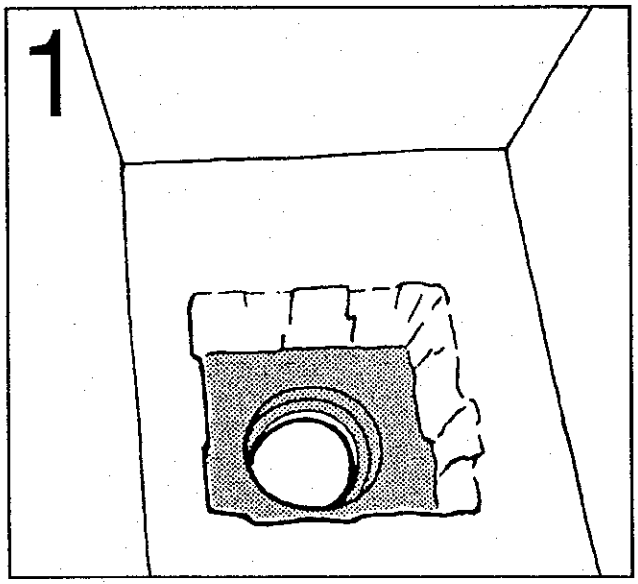


Set nozzle and ram space with special ramming mass.

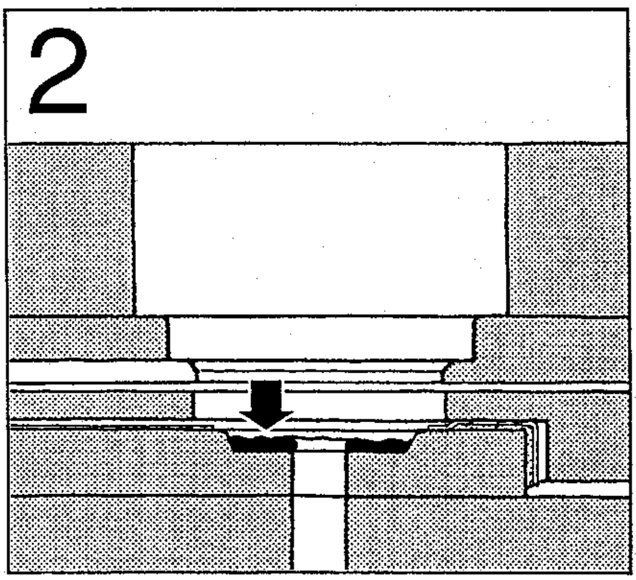
NOTE: Gas hose must be positioned into slot!

Гл2-770-35-95, лист 10

If nozzle is set from top with gate on tundish:

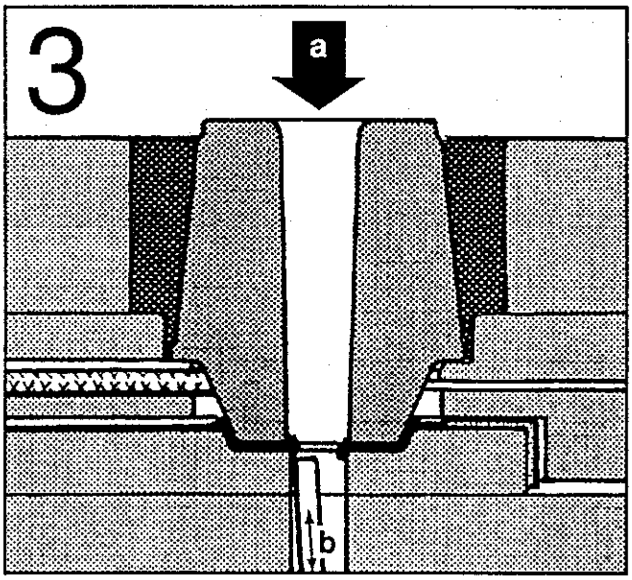


Clean nozzle bearing surface and tundish bottom.



Fill slot of upper plate with RESITECT 190 K SV.

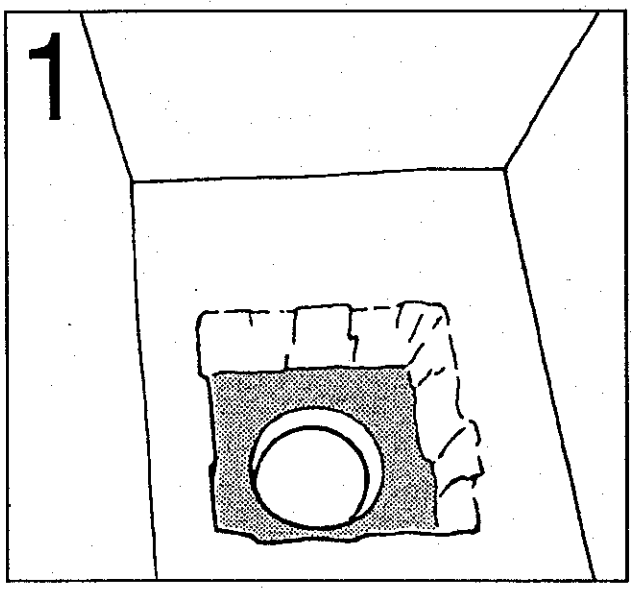
NOTE: Mortar should not be too dry!



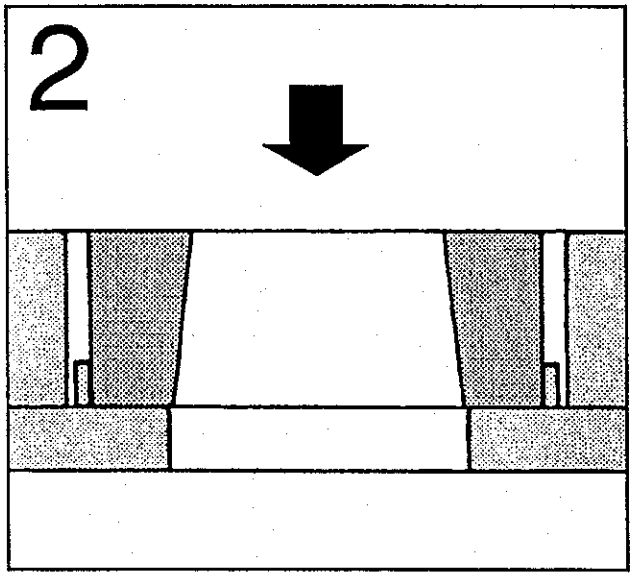
a) Set nozzle and ram space with special ramming mass.
   NOTE: Gas hose must be positioned into slot!

b) Clean casting hole of excess mortar.

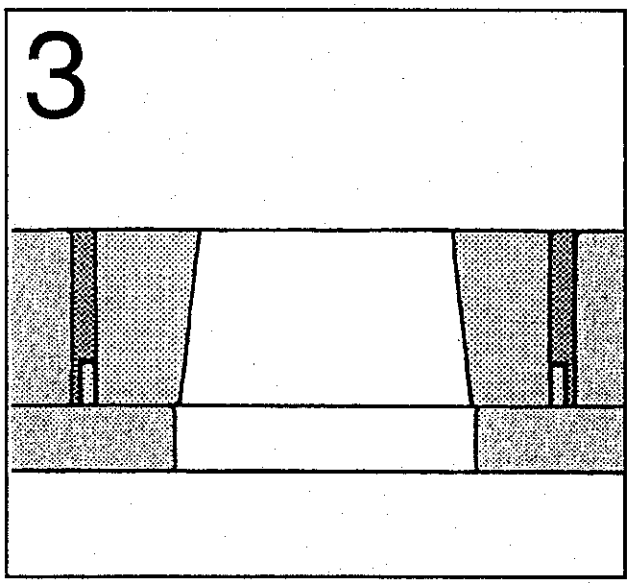
If nozzle is set from below:



Clean well block bearing surface and tundish bottom.



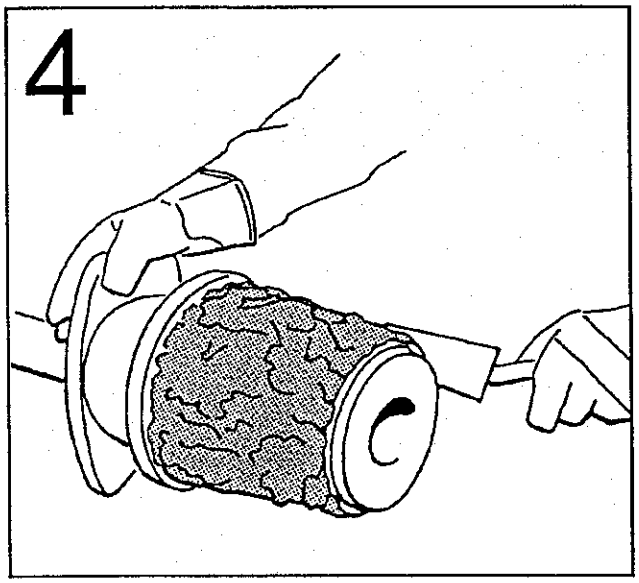
Set well block into center.



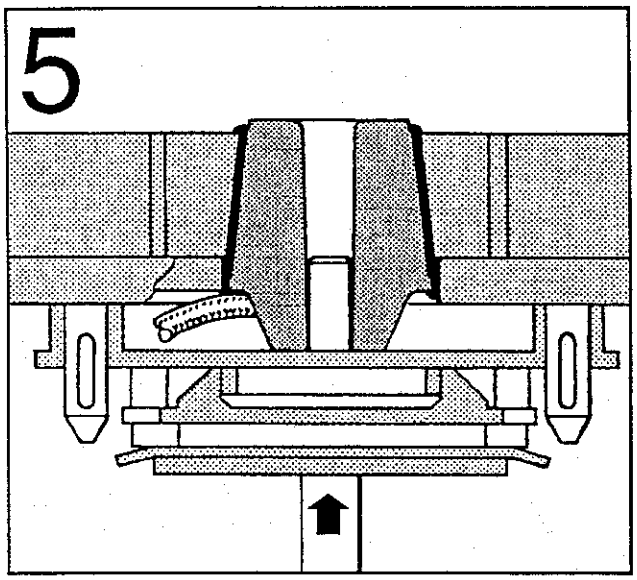
Ram space with COMPRIT 70 SV.

NOTE: Let it dry before setting nozzle.

Jn2-TN-35-95, Aucm 12



Put DURAMUR 70 SV around the nozzle.

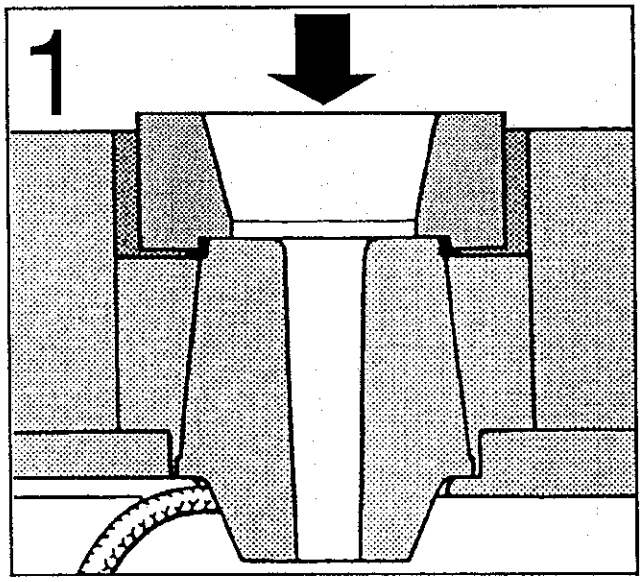


Set nozzle with assembly car and nozzle setting device (device on stop). Press against it until mortar has dried.
NOTE: Gas hose must be positioned into slot.

Remove assembly car and excess mortar.

Эл2-770-35-95, лист 3

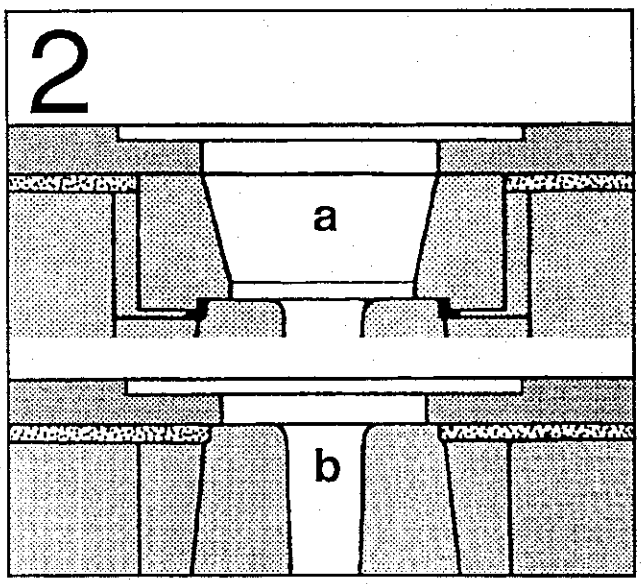
If tundish bottom is higher than nozzle:



Put RESITECT 190 K SV into slot of nozzle top.

Set nozzle-top on nozzle and press against it.

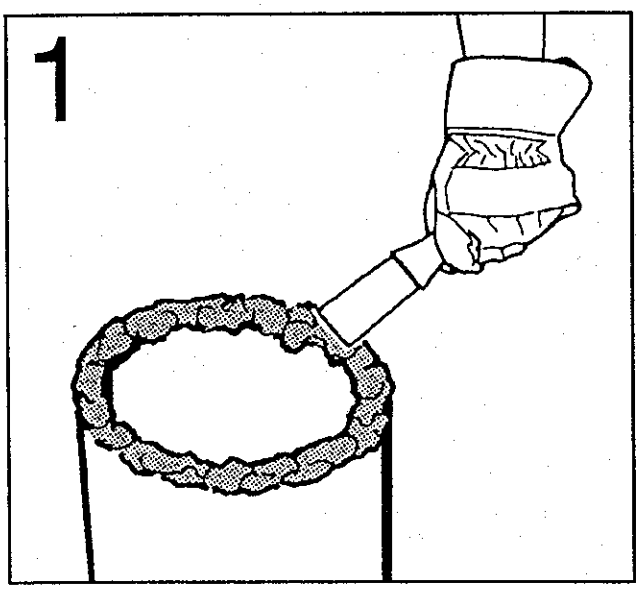
Ram space with special ramming mass.



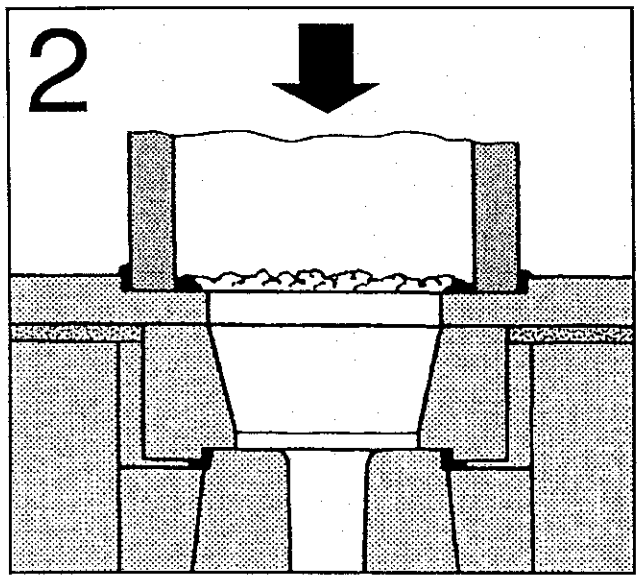
Put insulation plates on tundish bottom according to instructions of supplier.

NOTE: Reproduce area around casting hole according to picture:
a) with nozzle-top
b) without nozzle-top

Using starter tube:



Put some BLAKITE SV on starter tube.



Press starter tube onto board.

Remove excess mortar inside the starter tube.

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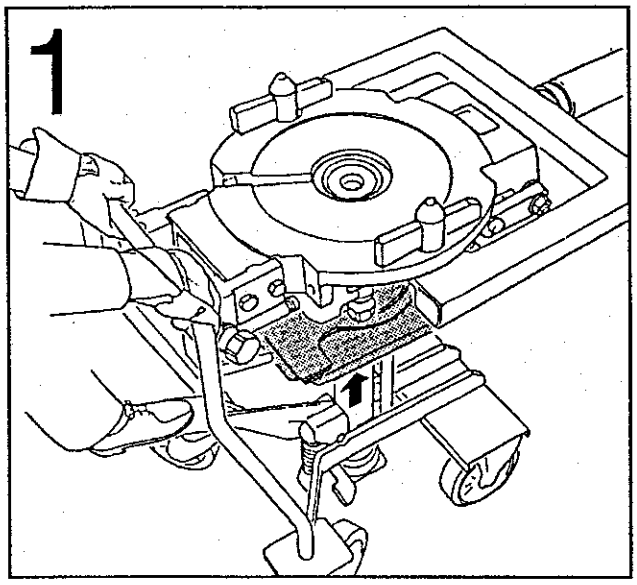
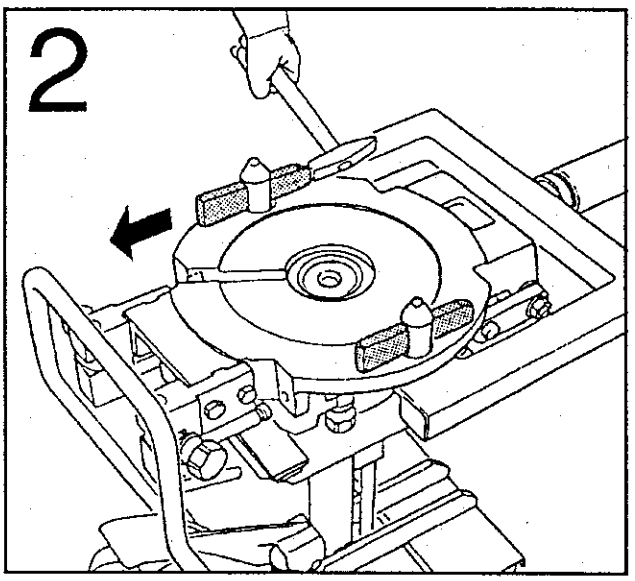
3.3 Assembly Tundish Gate to Tundish

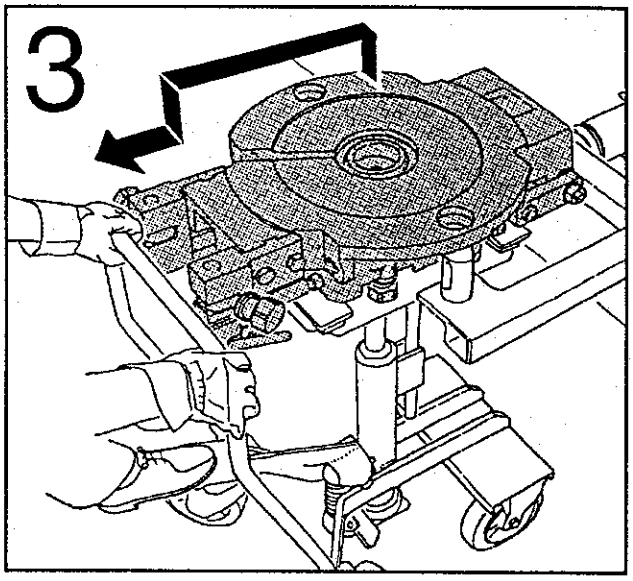


Place assembly car under tundish gate in assembly rack.

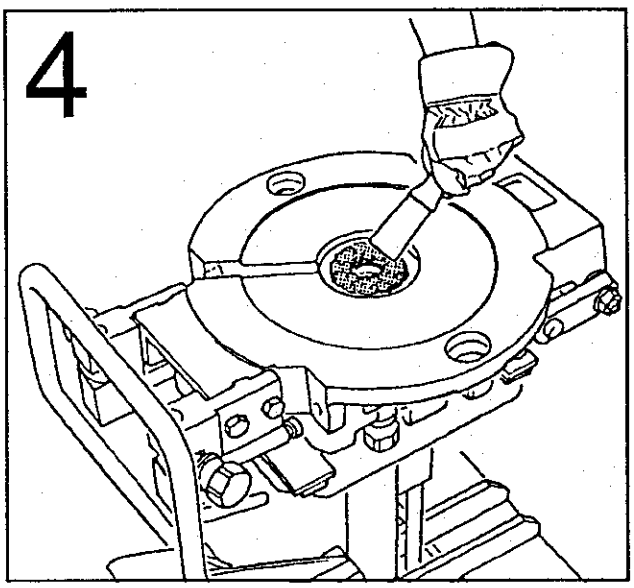
Raise lifting table up to tundish gate and center it.



Remove both wedges.

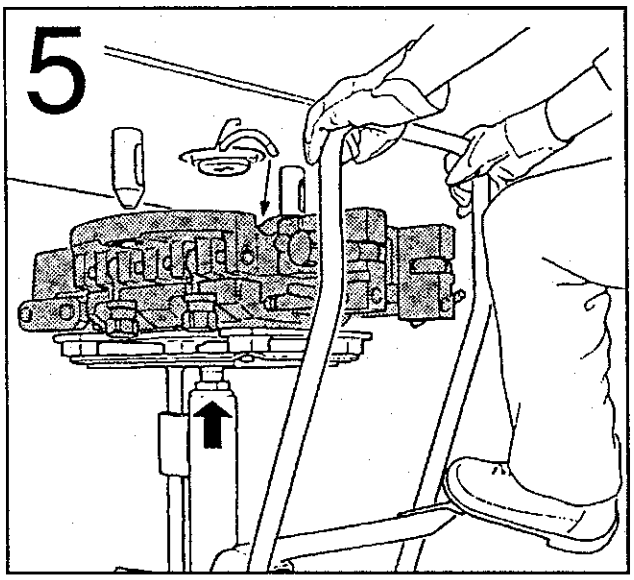


Lift tundish gate off center pins and move away.



Fill slot of upper plate with RESITECT 190 K SV.

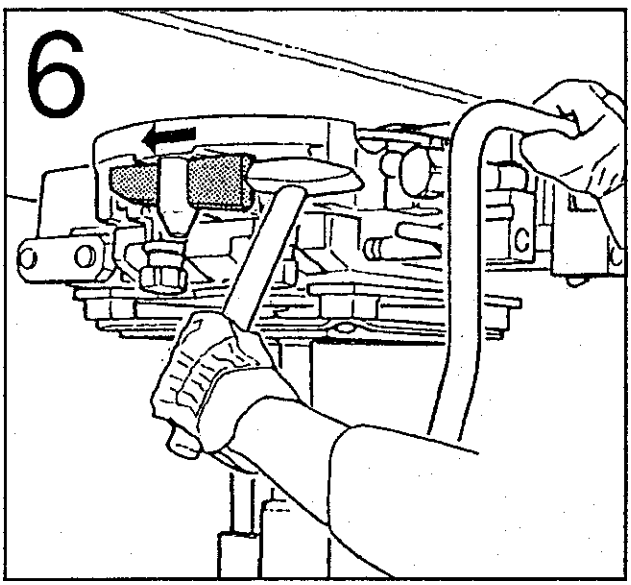
NOTE: Mortar should not be too dry.



Position assembly car under the tundish.

Raise lifting table until the tundish gate is centered and butted to the tundish bottom.

NOTE: Gas supply must be placed into slot.



Set both wedges.

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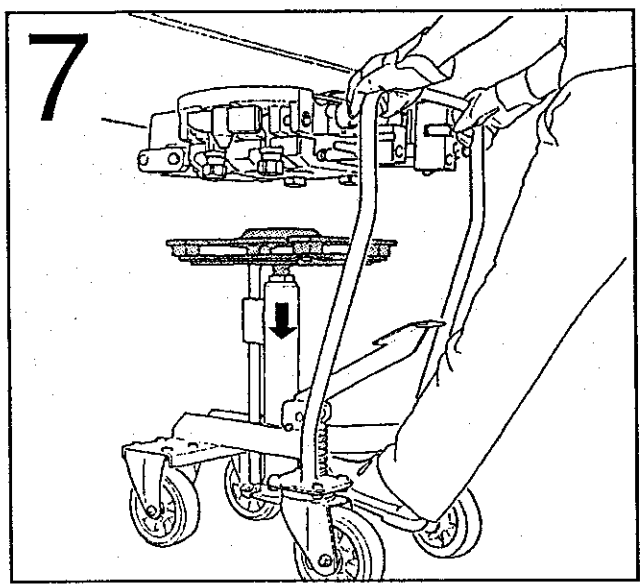
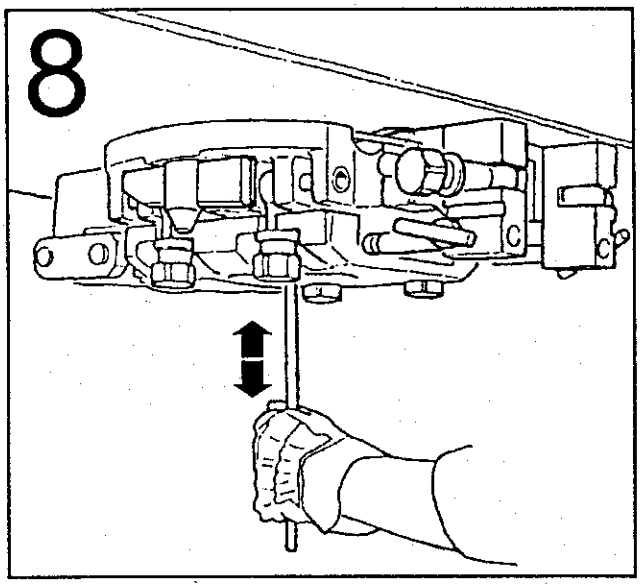


Lower lifting table and move away assembly car.



Clean casting hole of excess mortar.

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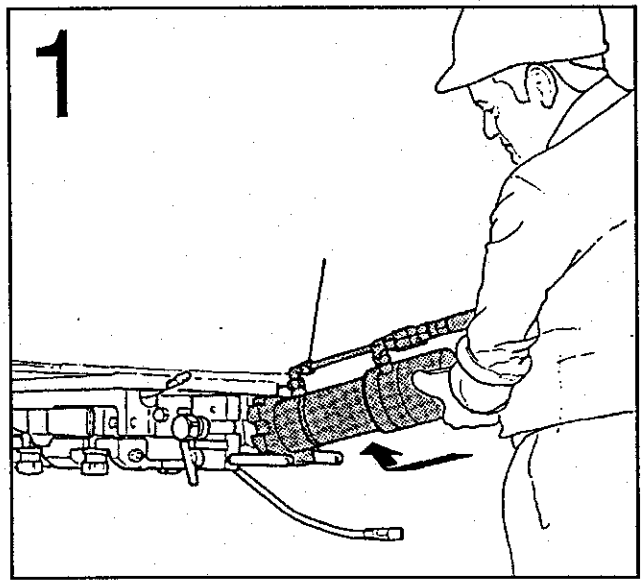
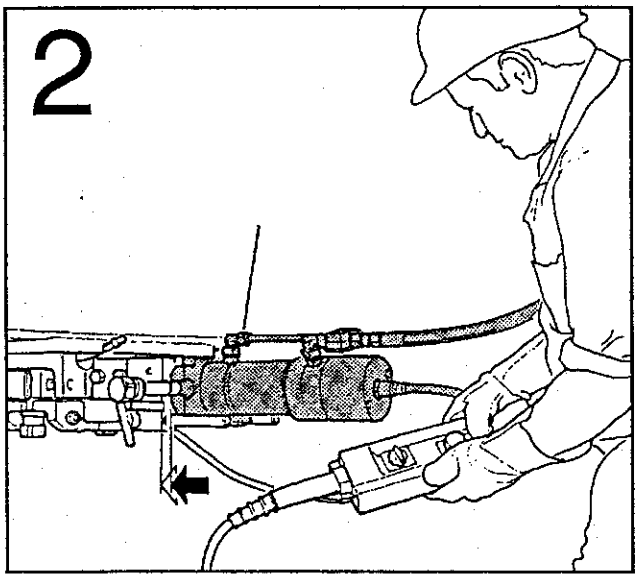
3.4 Make Tundish Gate Ready for Casting

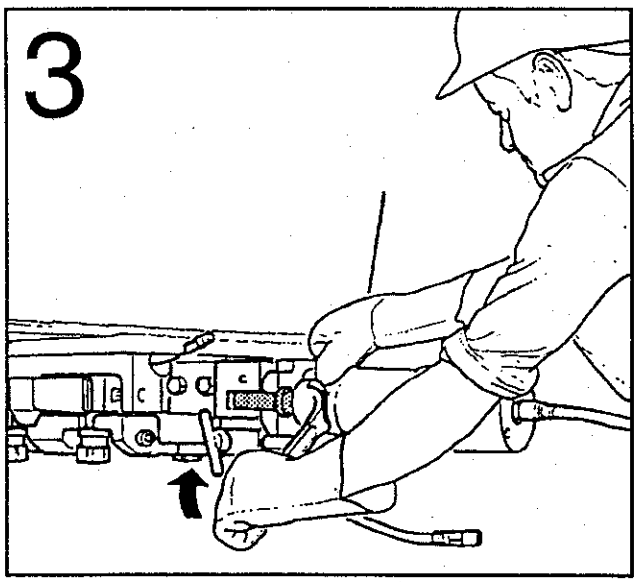
(on tundish in waiting position)



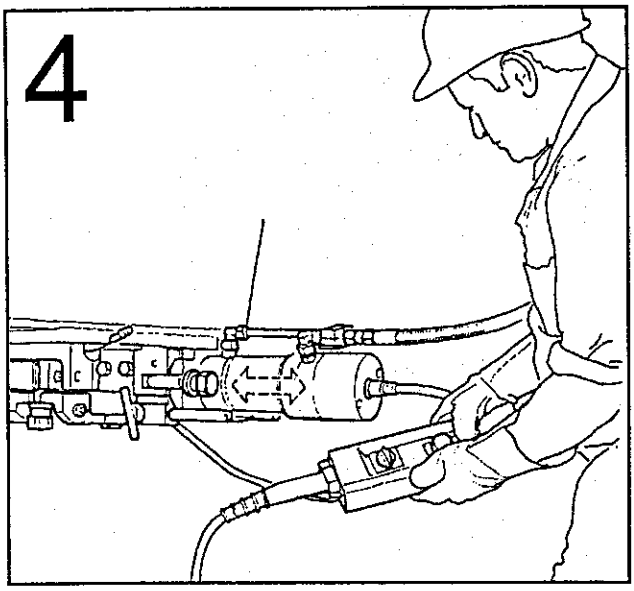
Place cylinder on dowel pins and couple it with middle plate frame jaw.



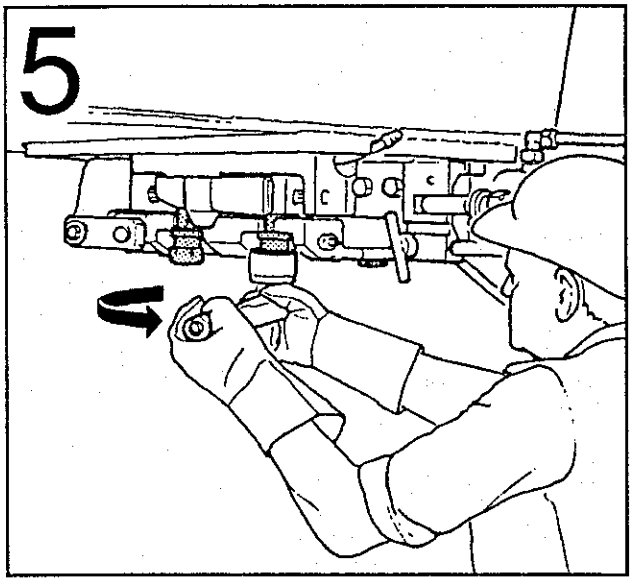
Move cylinder to end position.



Swing in both screws and tighten them with wrench.

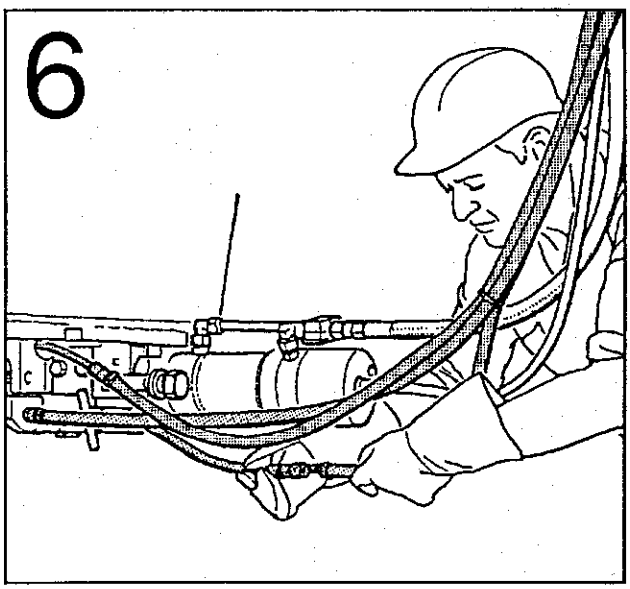


Move middle plate several times back and forth; stop in position "open".

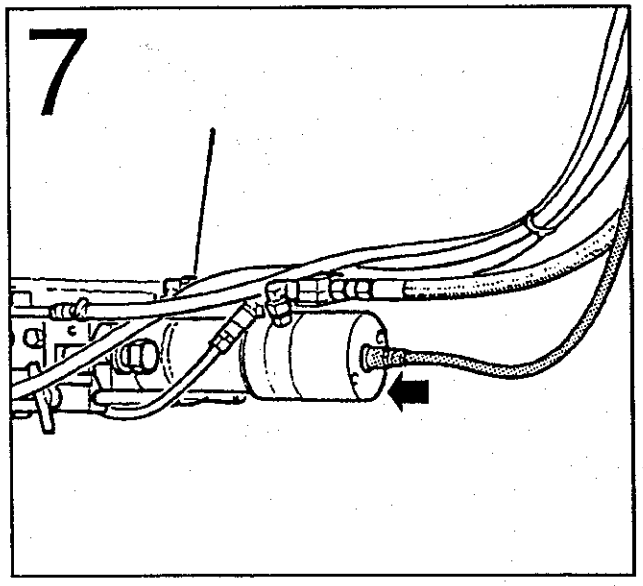


Retighten cover nuts in given order (Torque 25 ft. lb., 35 Nm/3,5 mkg)

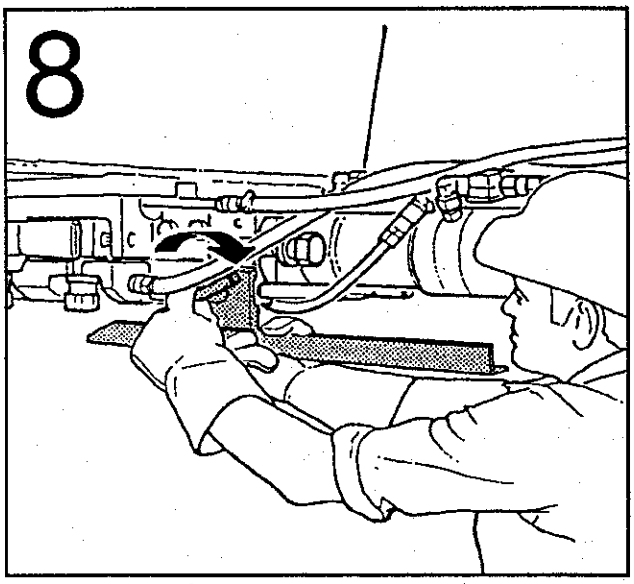
Move middle plate into position "open".



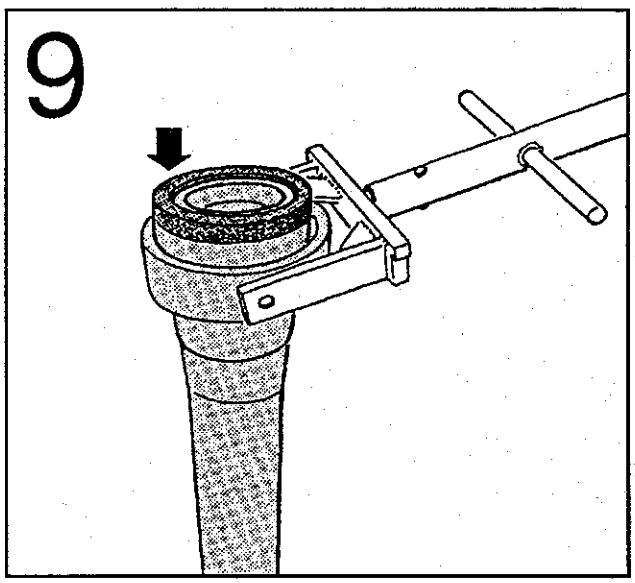
Connect all argon lines (nozzle, middle plate, pouring tube) with argon box.



CHECK: Connection of signal cable with cylinder.



Mount and lock rails for pouring tube manipulator to tundish gate.



Set pouring tube into manipulator and mount outer-gasket.

Check inner gasket.

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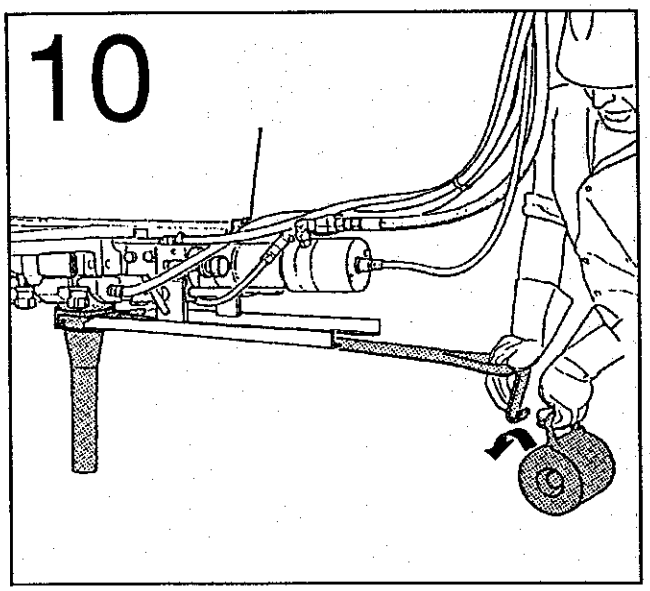
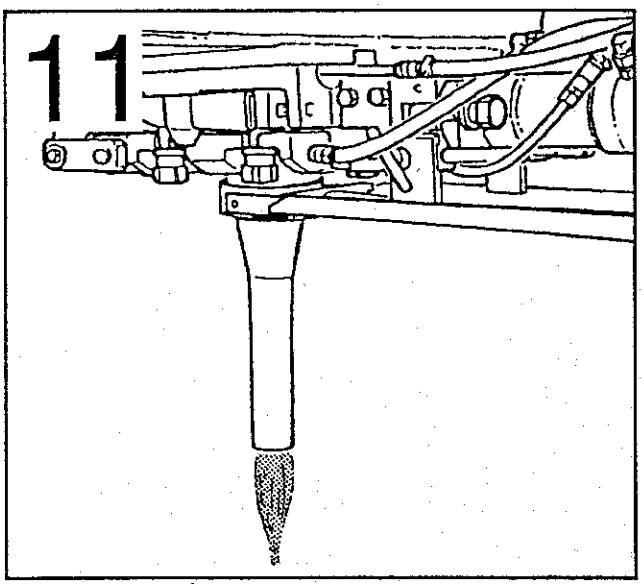


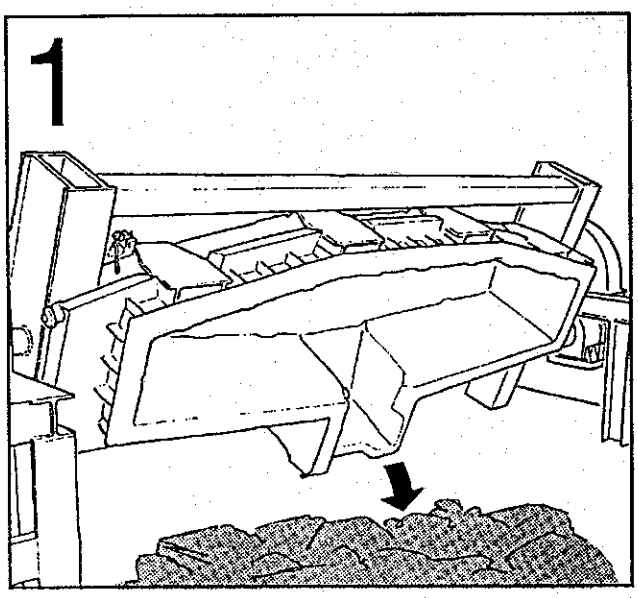
Slide manipulator with pouring tube on the rails to the end stop. Press down and hang counter weight on manipulator.



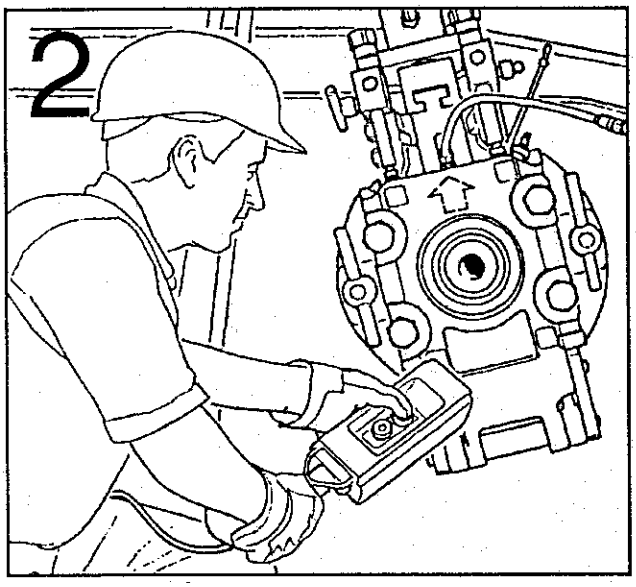
Heat casting bore from top or below.
The pouring tube can also be preheated in a special oven.

3.8 Multiple Heat Inspection

(by single heat)

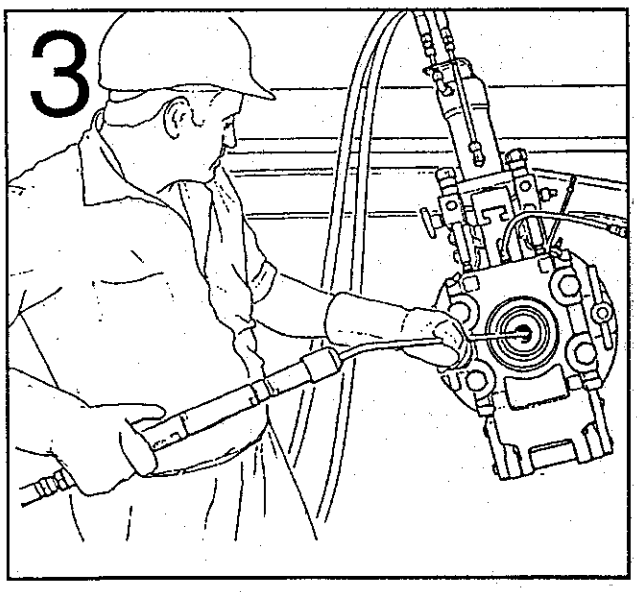


Remove remaining steel from tundish within 15 minutes.



Mount test cylinder.

If necessary move middle plate into "open" position.



Clean casting hole cautiously with oxygen.

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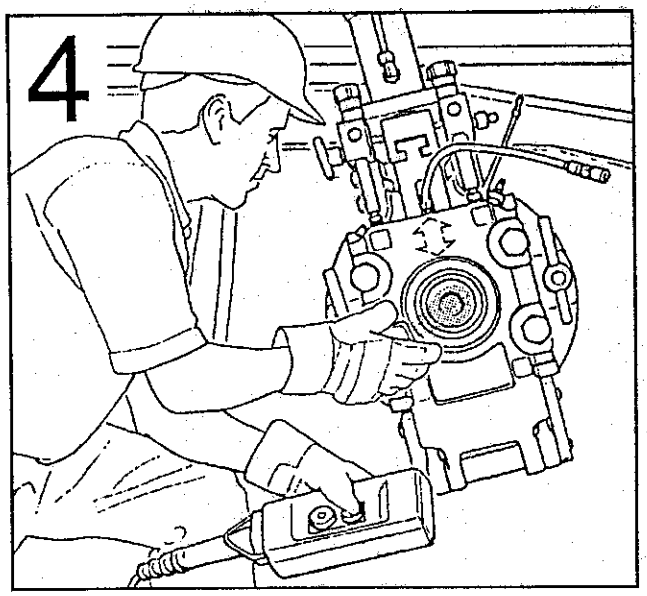
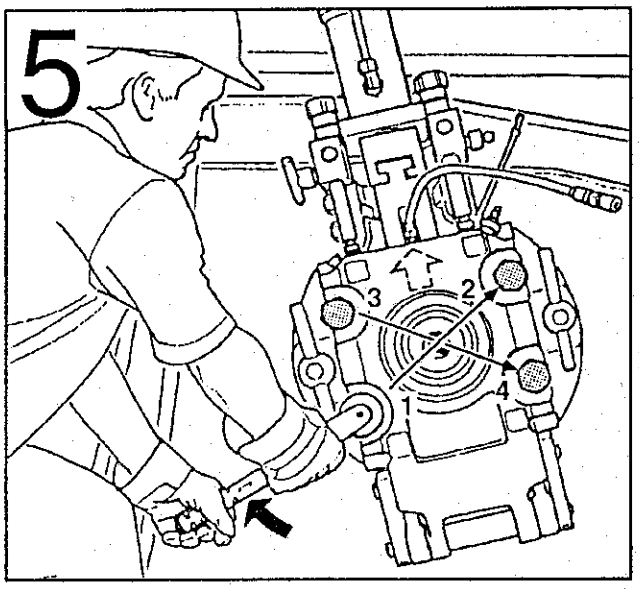


Jog middle plate back and forth and again into "open" position.
If there are any steel tabs between the plates: Loosen and remove them.

Visual check of wearing of refractory parts.

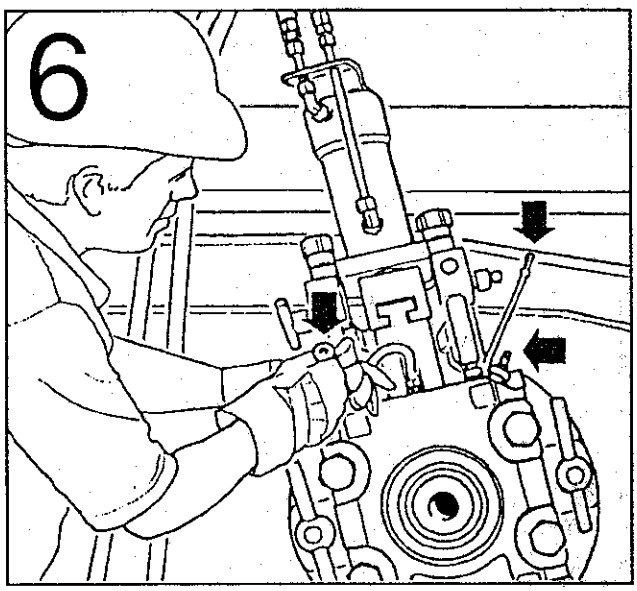


Reuse of refractory parts:

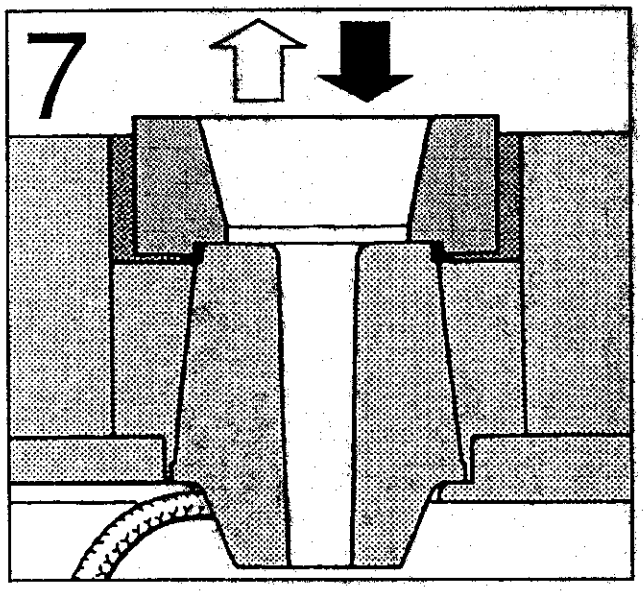
a) Move middle plate into "open" position.

b) Retighten all cover nuts with torque wrench (25 ft.lb.,35 Nm/3,5 mkg) in given order.

NOTE; Cover nuts must not be loosened.



Check all gas connections (nozzle, middle plate, pouring tube).



If necessary replace nozzle-top.

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