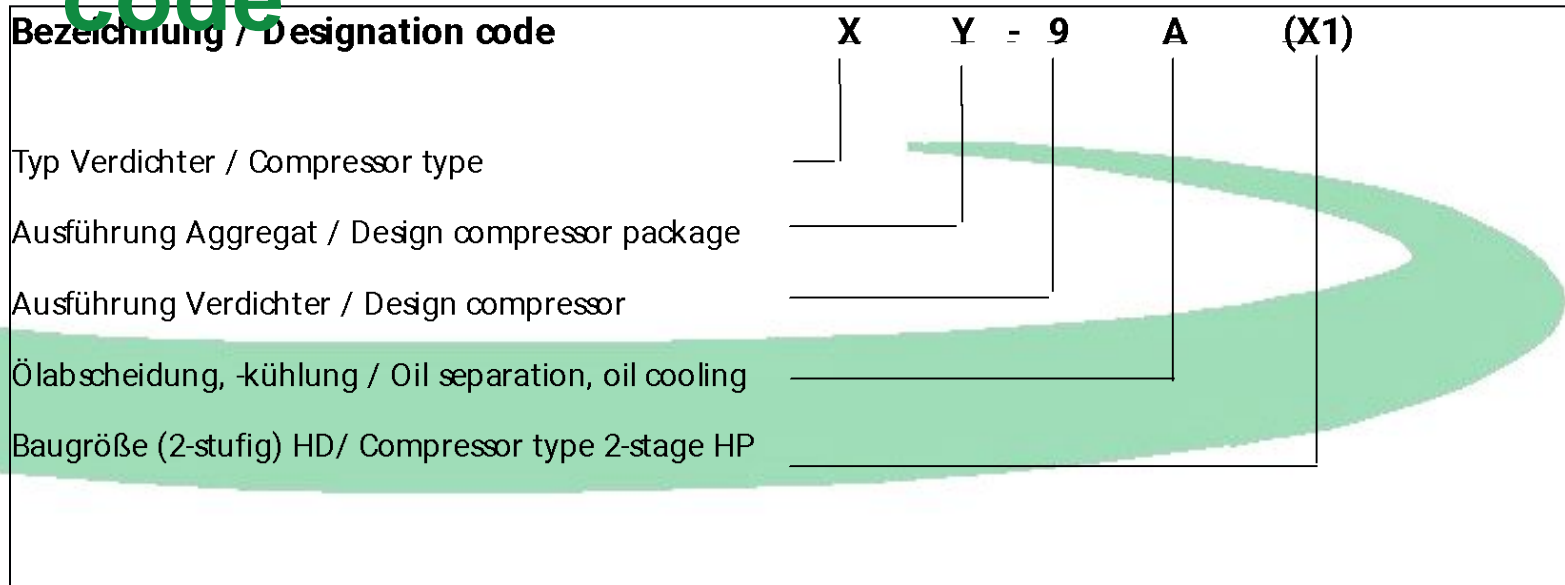


Grasso GmbH Berlin Service Department

Schulung / Training *PART II*

*Schraubenverdichteraggregate & Komponenten
screw compressors packages & components*

Bezeichnung / Designation code



Aggregatebezeichnung / Package designation code

X SCHRAUBENVERDICHTERTYP / SCREW COMPRESSOR TYPE
 C, D, E, G, H, L, M, N, P, R, S, V, W, Y, Z, XA, XB, XC, XD, XE, XF

Y Aggregateausführung / design screw compressor package

Codeletter	NH3	R22	HFKW	R290 / R600a	CO2
Oil separator - horizontal - base / Ölabscheider – horizontal- unter	A	H	R	F	O
Oil separator - vertical/ Ölabscheider – vertikal	B	K	S	G	P
Oil separator horizontal in row/Ölabscheider horizontal - in Reihe	C	L	T		
Duo-Pack	D	M	V		
Two stage packages / Zweistufige Aggregate	E	N	U		

9 Ausführungsvariante/Design type:

Codeletter	Merkmale	Features	Vi
1	Vi fest	Vi fixed	2.6
2	Vi fest	Vi fixed	3.6
3	Vi fest	Vi fixed	4.8
4	Vi fest	Vi fixed	5.5
5	Vi variabel	Vi variable	2.6-4.8; 2.6-4.0; 3.2-4.8
6	Booster, Vi dest	Booster, Vi fixed	2.6; 3.6
7	Wärmepumpe	Heat pump	2.6; 3.6
8	SMALL – 2 Leistungstufen	SMALL- 2 capacity steps	2.6; 3.6; 4.8
9	Frequenzgesteuert, Type G, N	Frequency controlled, TypeG, N	Stufenlos/Continuously.

A ÖLABSCHEIDUNG, ÖLKÜHLUNG / OIL SEPARATION - OIL COOLING

code letter	Mit Feinölabscheidung With oil fine separation	code letter	Ohne Feinölabscheidung Without oil fine separation
A	Wassergekühlte Ölkühler, Water cooled oil cooler	G	Wassergekühlte Ölkühler, Water cooled oil cooler
B	Kältemittelgekühlte Ölkühler, Refrigerant cooled oil cooler	H	Kältemittelgekühlte Ölkühler, Refrigerant cooled oil cooler
C	Kältemittleinspritzung, Refrigerant injection	K	Kältemittleinspritzung, Refrigerant injection
D	Wasser- und kältemittelgekühlte Ölkühler Water and refrigerant cooled oil cooler	L	Wasser- und kältemittelgekühlte Ölkühler Water and refrigerant cooled oil cooler
E	Wasser- oder kältemittelgekühlte Ölkühler in Verbindung mit Kältemittleinspritzung, Water or refrigerant cooled oil cooler and refrigerant injection	M	Wasser- oder kältemittelgekühlte Ölkühler in Verbindung mit Kältemittleinspritzung, Water or refrigerant cooled oil cooler and refrige injection
F	Ohne Ölkühler , Without oil cooler	N	Ohne Ölkühler , Without oil cooler

R+I Schema – Bezeichnung / P+I diagram-designation code

code	1. Buchstabe Meßgröße	1st indication letter measurand
P	Druck	Pressure
T	Temperatur	Temperature
L	Niveau	Level
E	Current	Current
F	Durchfluß	Flow
G	Position	Position

	Zusatz zur Meßgröße	Add on for measurand
D	Differenz	Differential

	Folgebuchstabe Funktion	following indication letter Function
I	Anzeige	Indication
S	Schaltung	switch
A	Alarm	Alarm
C	Steuerung	Control
T	Meßumformer-Fktn.	Transformer-Fctn.
Z	Schutzeinrichtung	Protection device

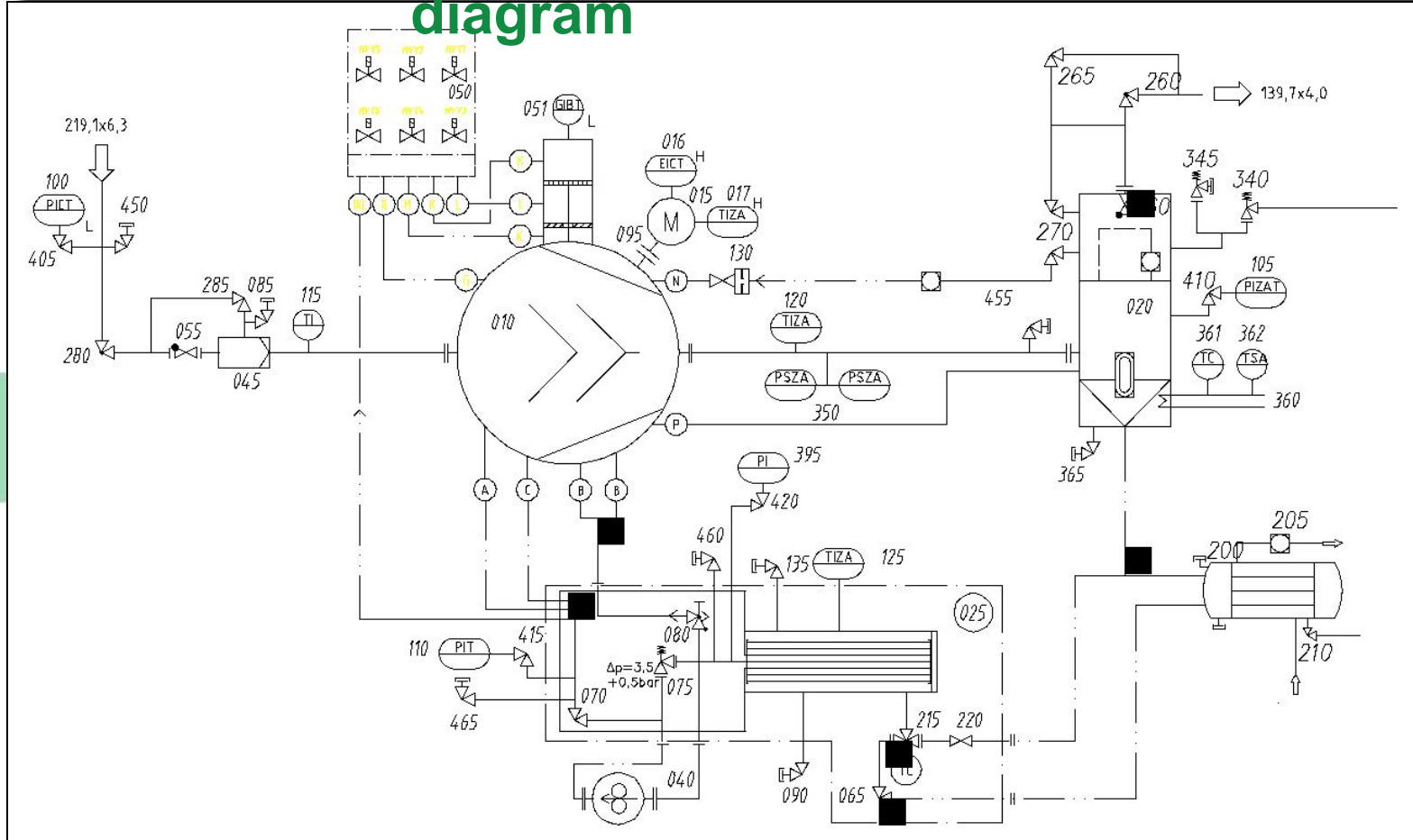


Bedienung und Anzeige am
Gerät
Non-remote display control

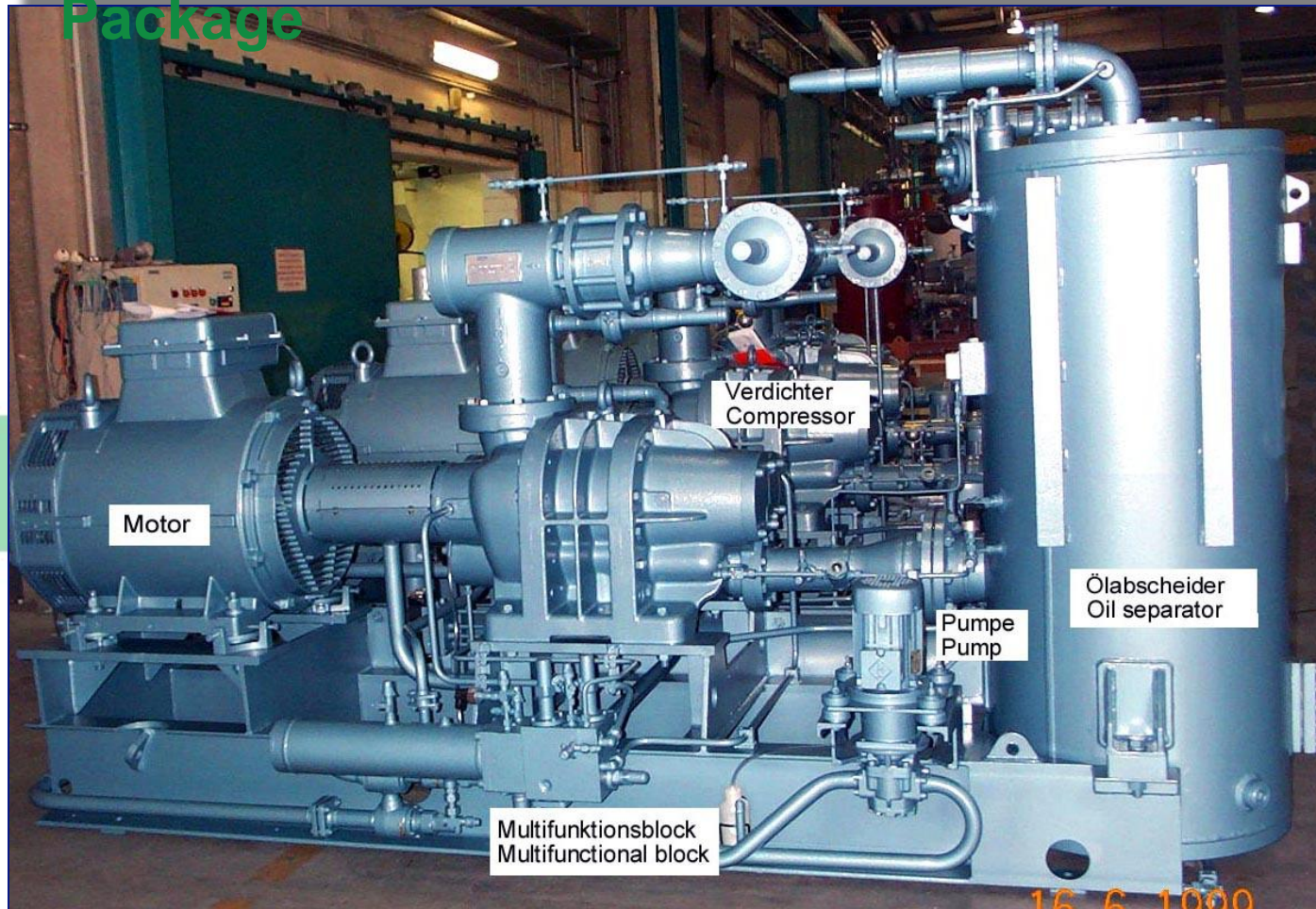


Fernanzeigend
Remote display & control

**R+I Schema / P+I
 diagram**



LARGE Verdichteraggregat / LARGE Package

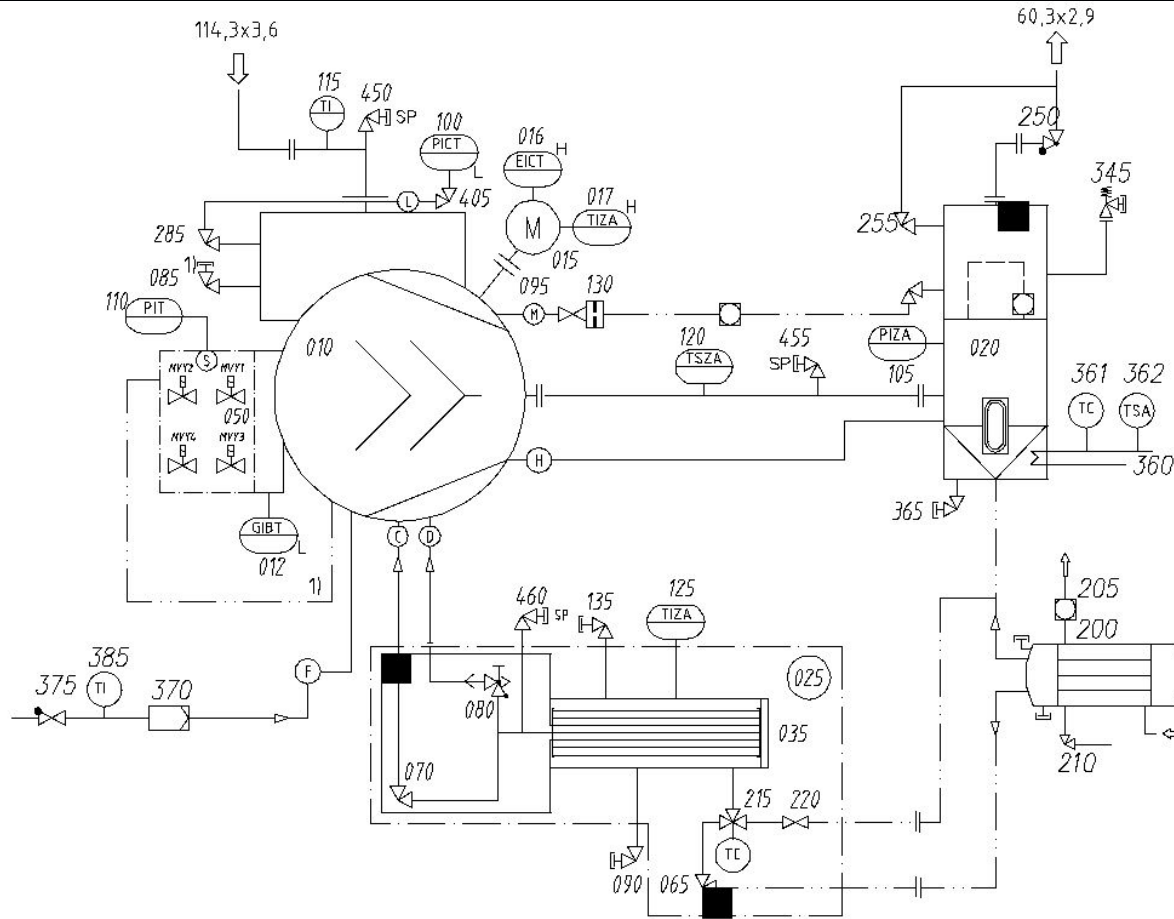


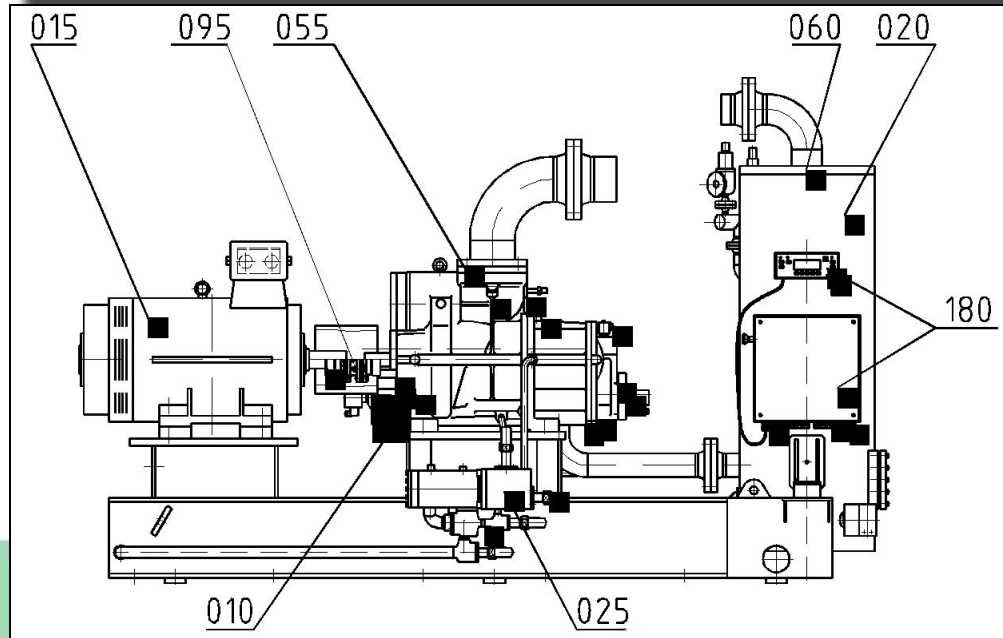
LARGE Ölrückführung / LARGE oil return



- Blende/orifice **1.0mm** - ID:0726330 (for 12mm piping / oil separator dm508)
- Blende/orifice **1.6mm** - ID:0726340 (for 12mm piping / oil separator dm711)
- Blende/orifice **2.0mm** - ID:0726350 (for 12mm piping / oil separator dm813)
- Blende/orifice **2.4mm** - ID:0726360 (for 12mm piping / oil separator dm1016)

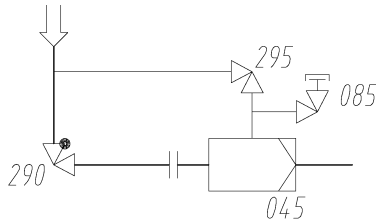
R+I Schema / P+I



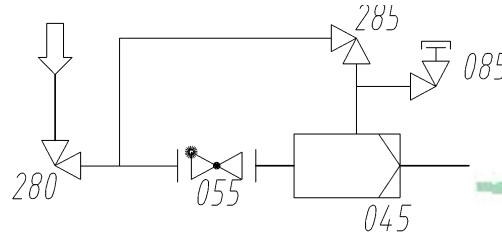


010	Verdichter / screw compressor	055	Rückschlagventil (integriert) / check valve - suction side (integrated)
015	Motor / compressor drive motor	060	Rückschlagventil / check valve - discharge side
020	Ölabscheider / oil separator	095	Kupplung / coupling
025	Filter mit Multifunktionsblock / oil filter with multi-function block	180	Steuerung / compressor control device
030	Ölkühler / oil cooler		safety devices
040	Ölpumpe (integriert) / oil pump (integrated into the compressor)		common base frame for all components
045	Saugfilter (integriert)/ suction filter (integrated into the compressor)		

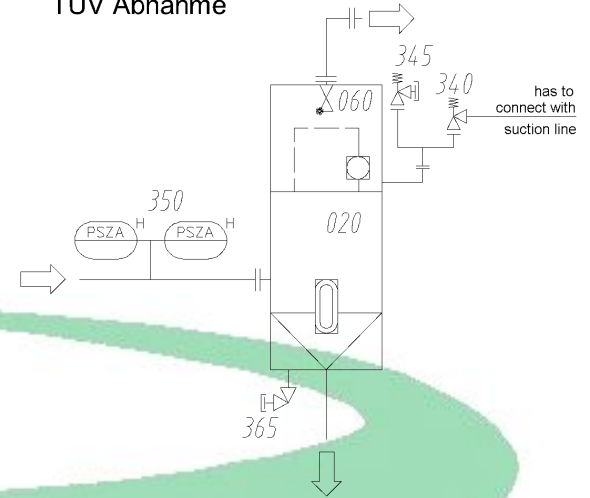
Refrigerant Inlet - Type B
Kältemiteleintritt – Typ B



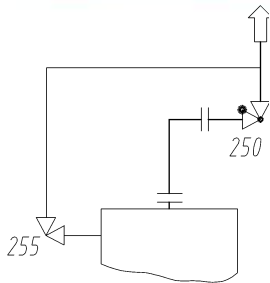
Refrigerant Inlet - Type C
Kältemiteleintritt – Typ C



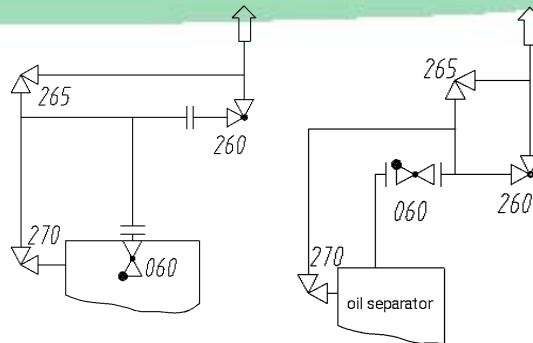
Official certification by TÜV (Germany)
TÜV Abnahme



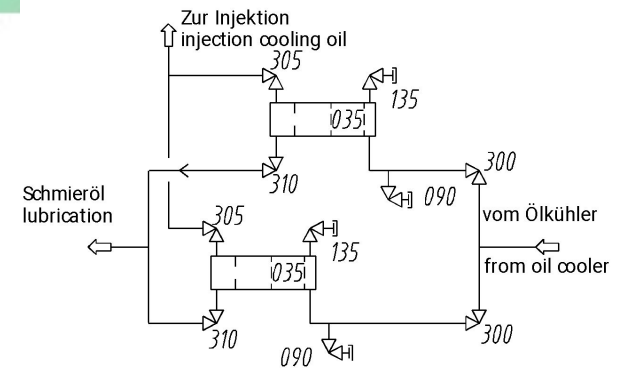
Refrigerant Outlet - Type B
Kältemittelaustritt – Typ B



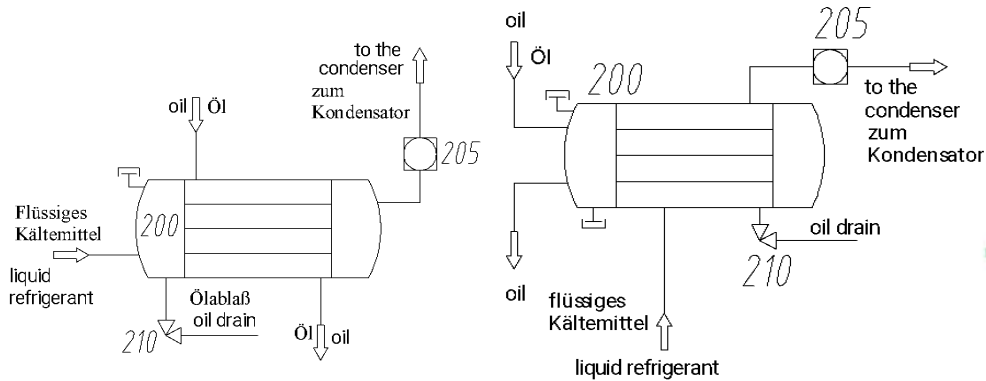
Refrigerant Outlet - Type C
Kältemittelaustritt – Typ C



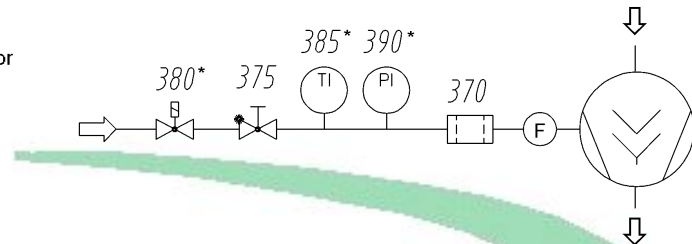
DOPPELÖLFILTER/EASY CHANGE OIL FILTER



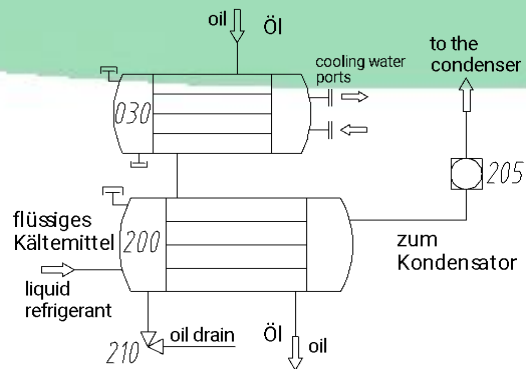
Kältemittel-gekühlte Ölkühler / Refrigerant cooled oil cooler



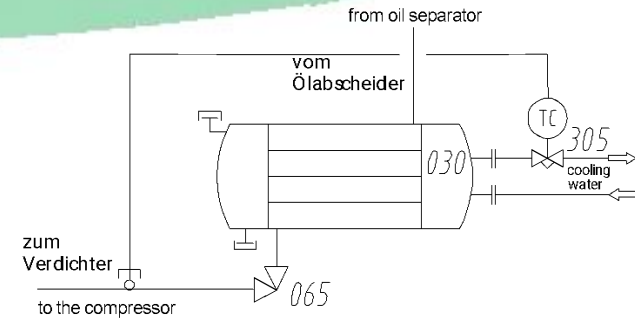
ECONOMIZER ANSCHLUß / ECONOMIZER OPERATION



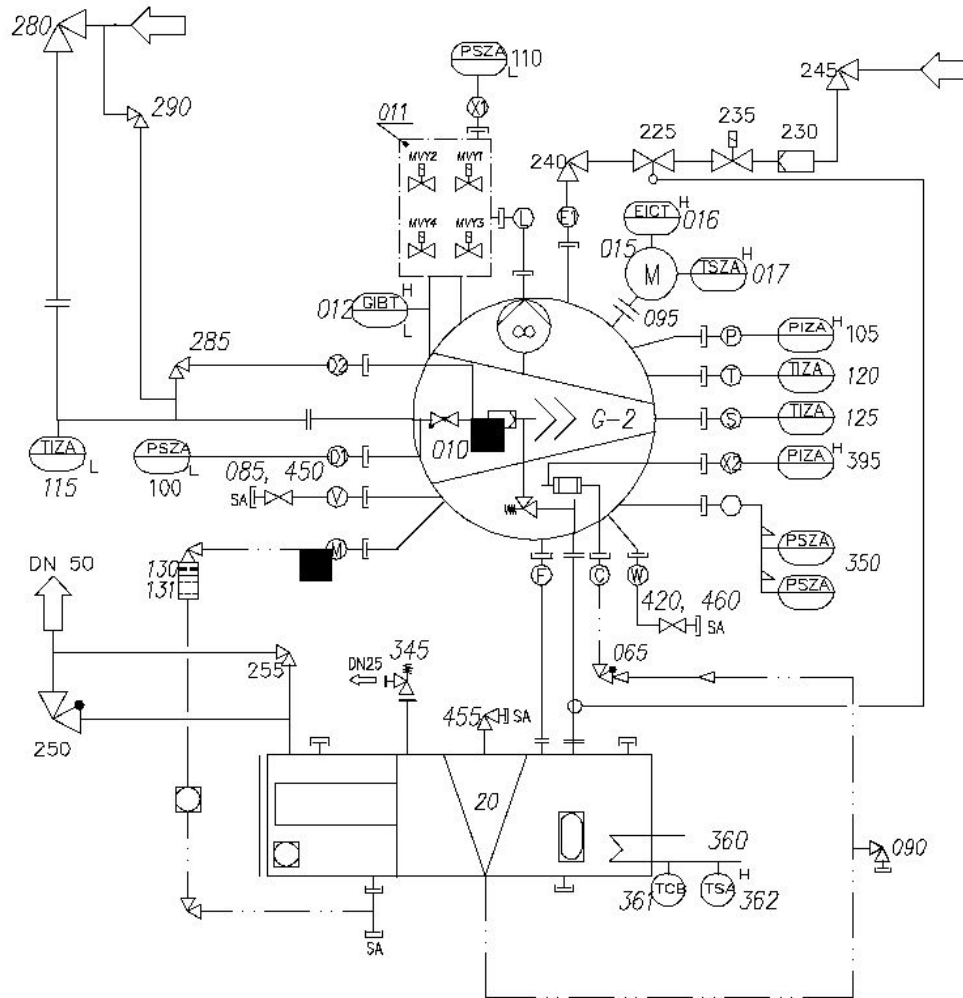
Wärmerückgewinnung / Heat recovery

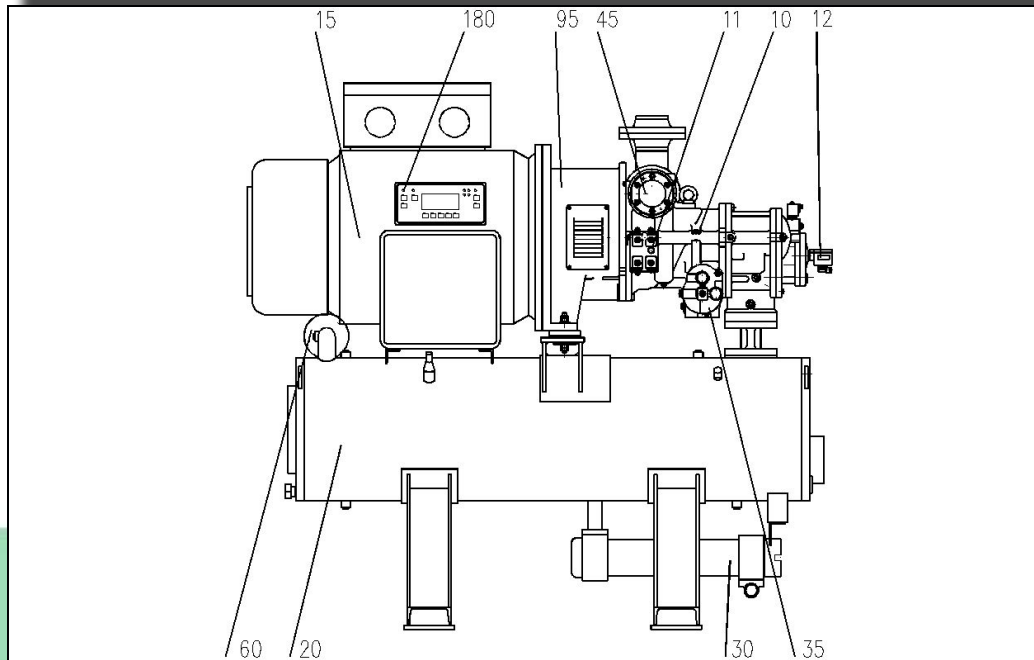


Kühlwasserregler / Thermostatic water valves



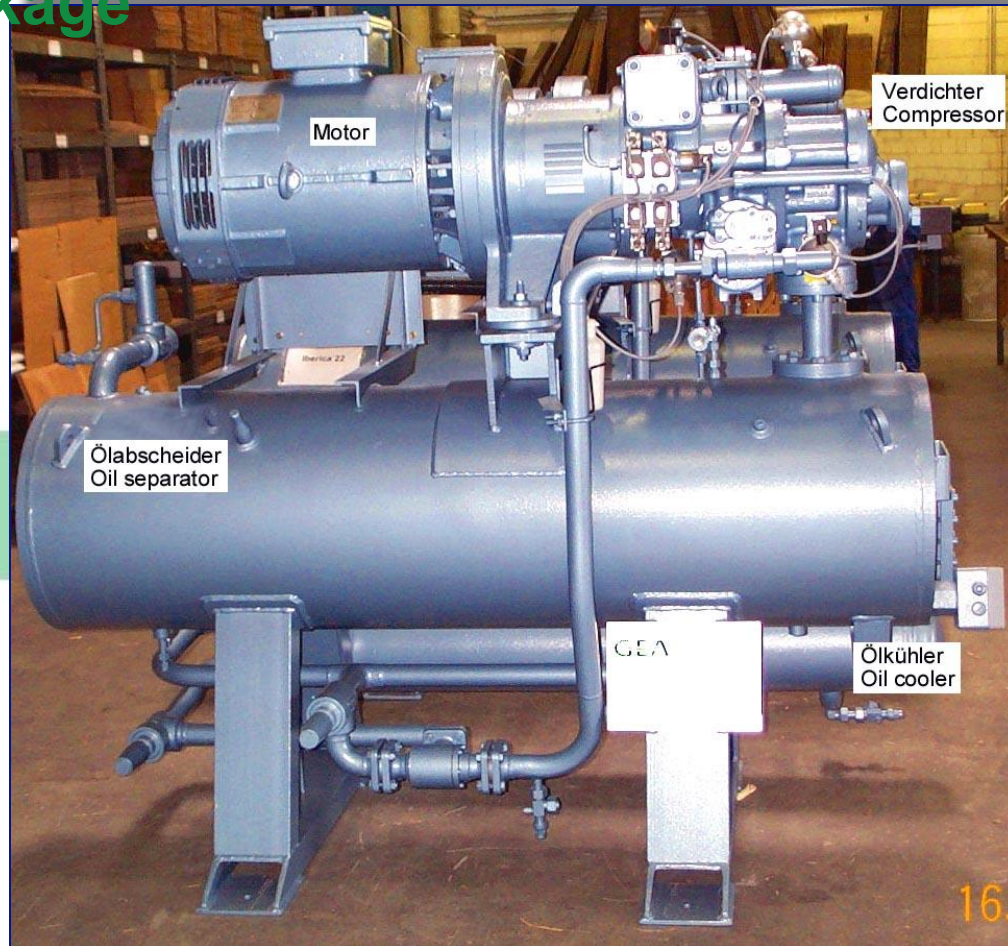
R+I Schema
 /
P+I diagram



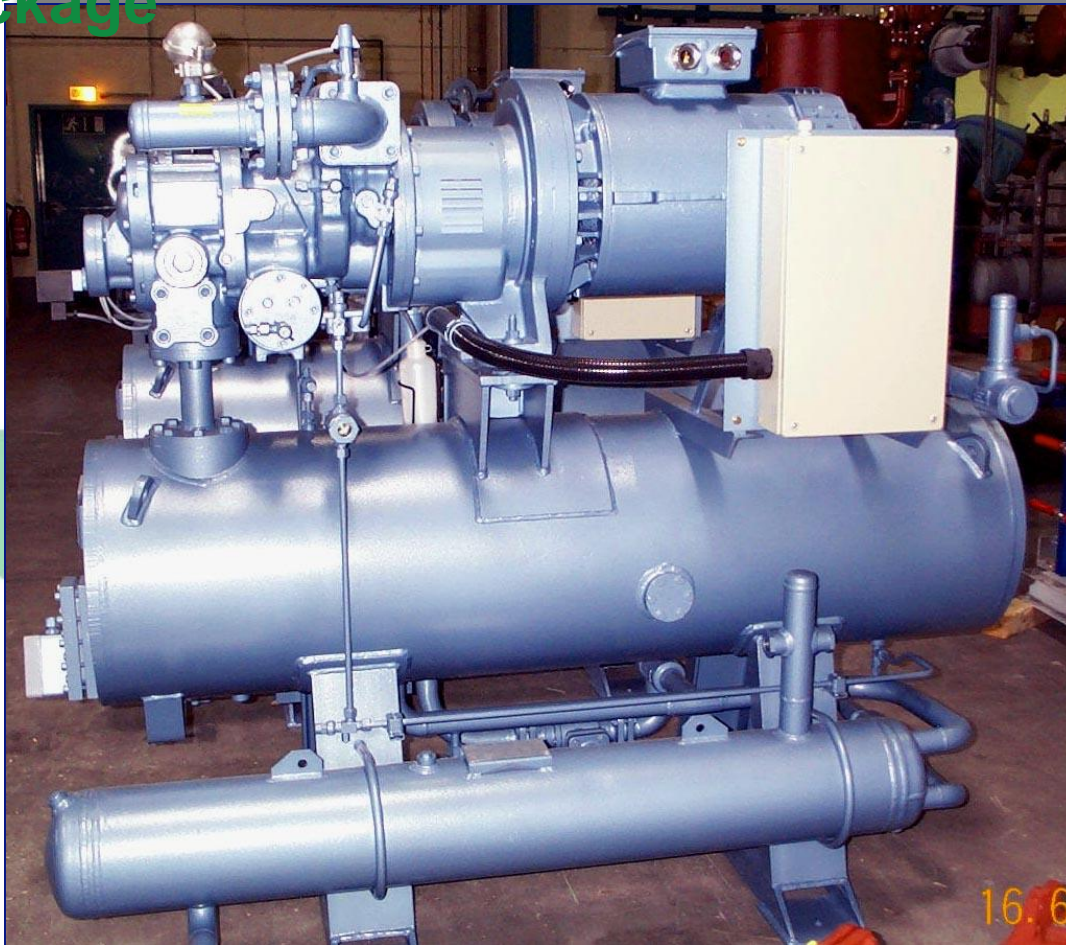


011	solenoid valve block	Magnetventilblock	045	suction filter (integrated)	Saugfilter (integriert)
012	position transducer	Wegsensor	055	check valve (integrated)	Rückschlagventil (integriert)
015	compressor motor	Antriebsmotor	060	check valve	Rückschlagventil
020	oil separator	Ölabscheider	080	control valve (integrated)	Regelventil Injektion (integriert)
030	oil cooler	Ölkühler	095	Coupling	Kupplung
035	oil filter (integrated)	Ölfiter (integriert)	180	control device	Steuerung

SMALL Verdichteraggregat / SMALL Package



SMALL Verdichteraggregat / SMALL Package



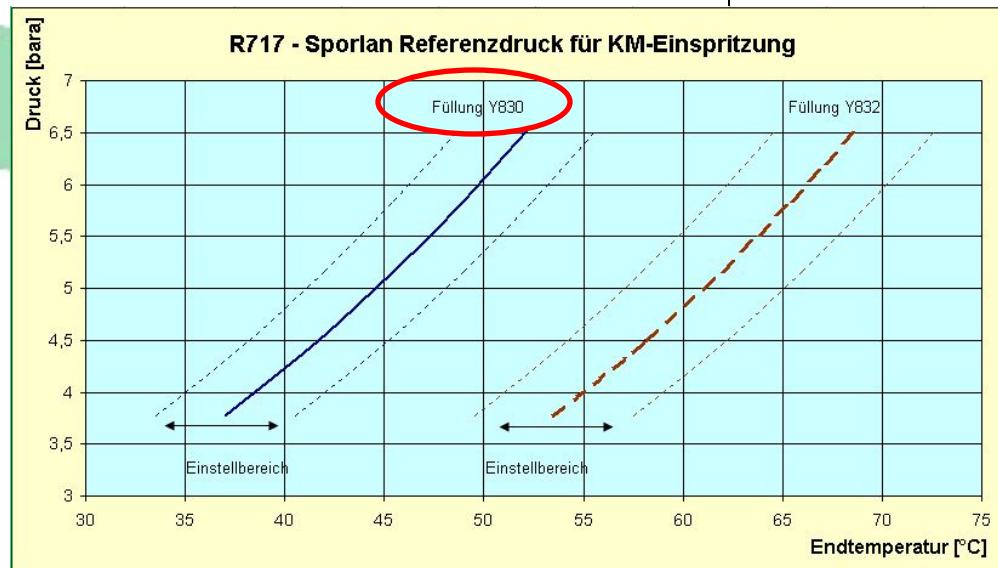
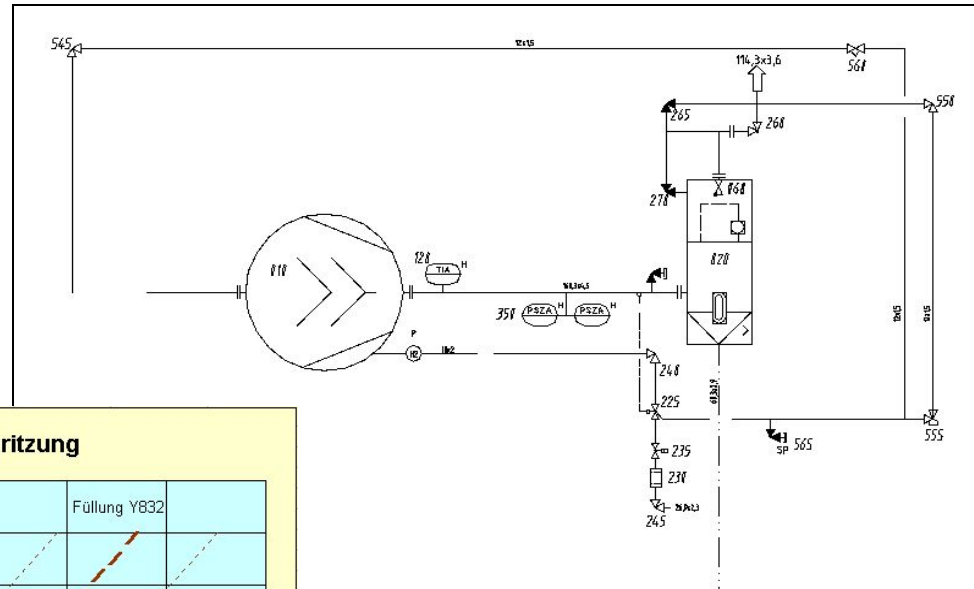
Kältemitelein-spritzung / Liquid injection

POS 550: Eckventil / angle valve

POS 555: Druckreguliertventil
pressure regulating valve

POS 560: Nadelventil / needle valve

POS 225: Thermostatisches
Expansionsventil
thermostatic expansion valve



Änderung Ölkreisläufe für Duo-Pack

Change of oil circuits for DUO-Packs

Ziel / goal:

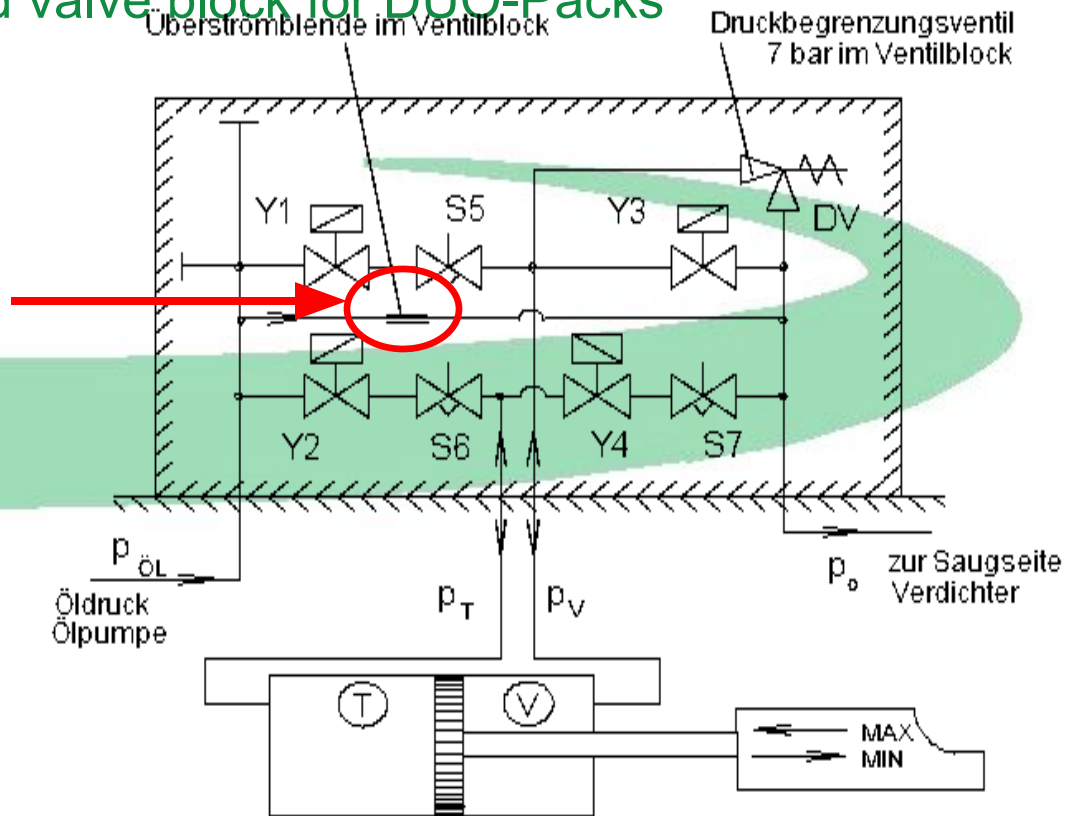
- Vereinheitlichung / Gleiches Steuerungskonzept
- Unification / one control concept

Einführung: 09/2001

Introduction: 09 / 2001

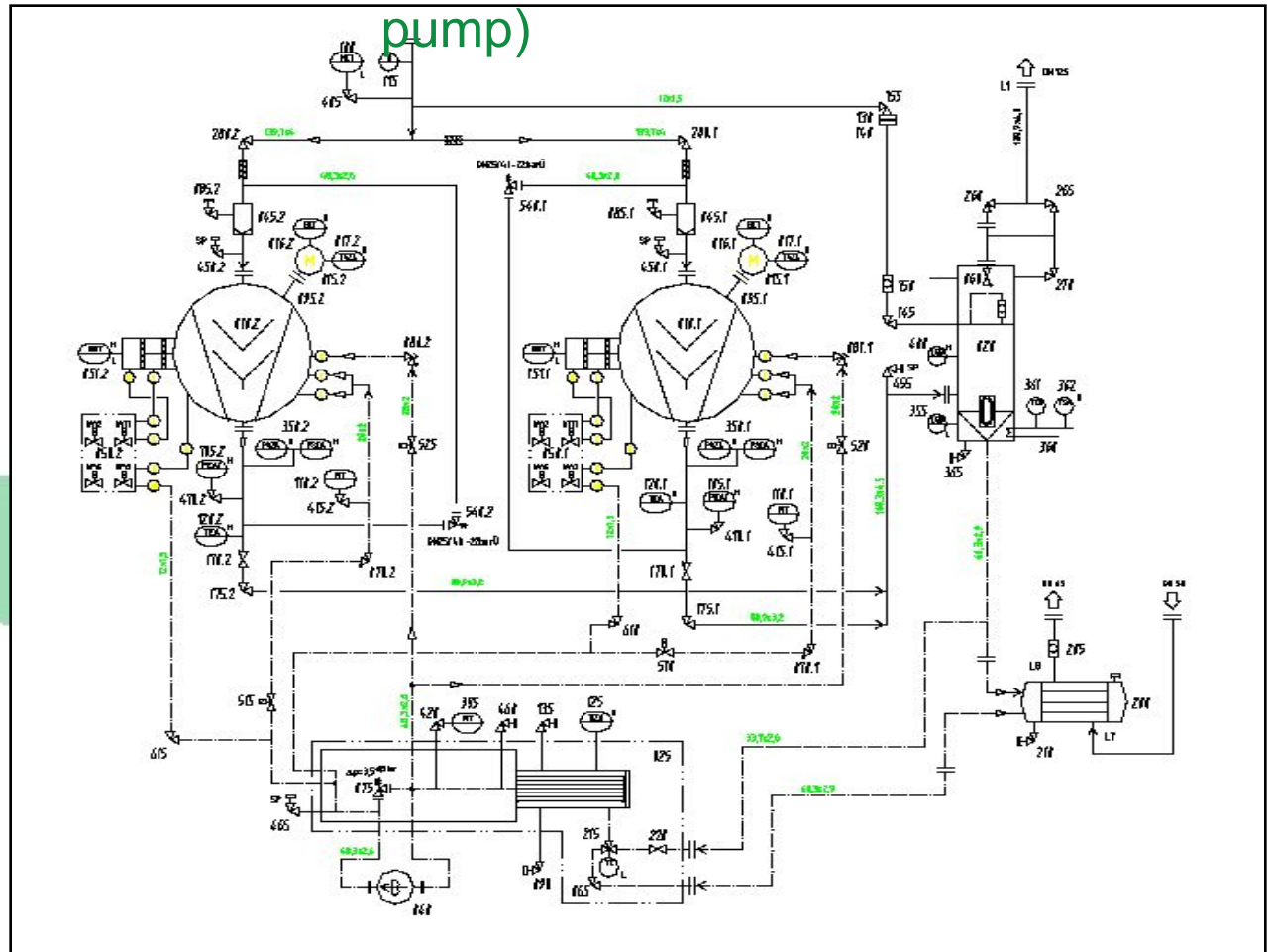
Magnetventilblock für Duo-Pack
Solenoid valve block for DUO-Packs

**Verschlußstück
 statt
 Überstromblende**
**Closing piece
 instead
 of orifice**

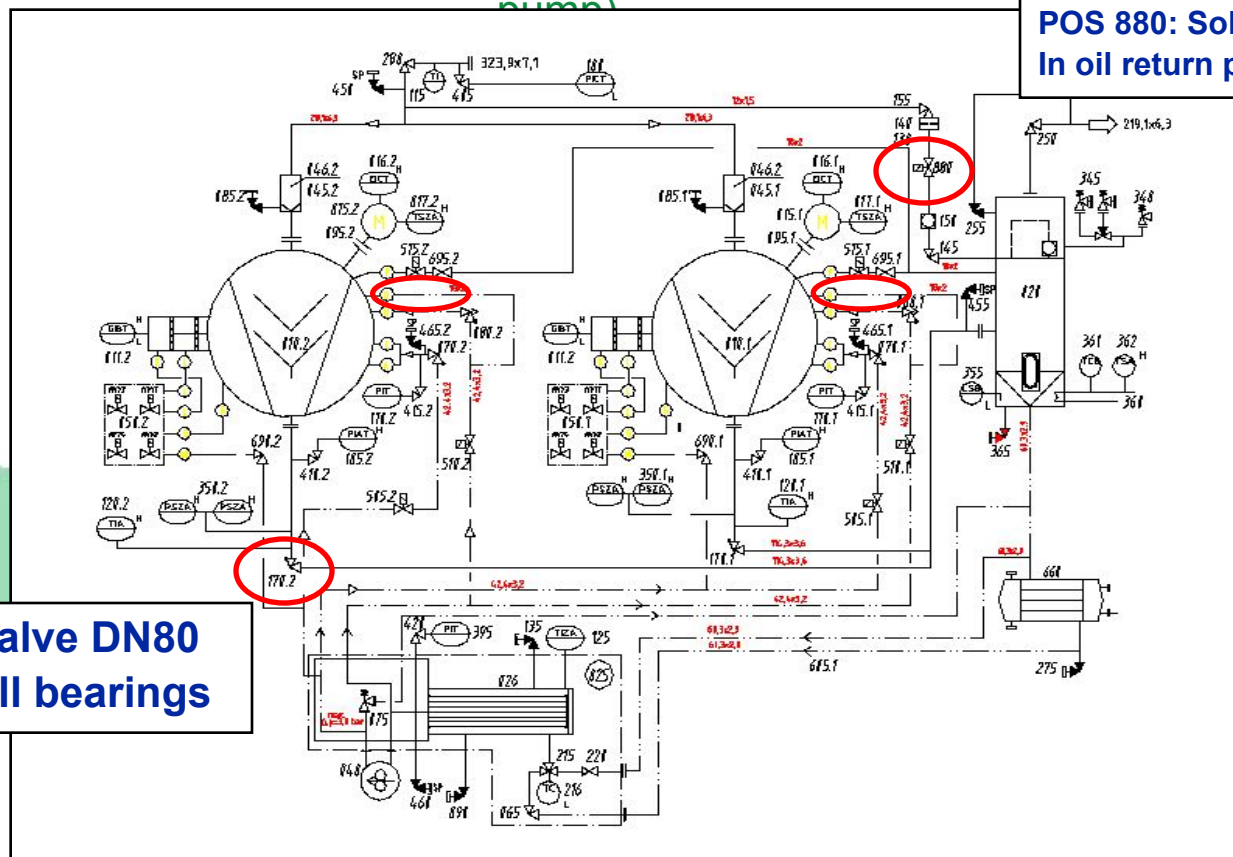


LARGE Duo-Pack (Externe Ölpumpe / external oil pump)

Markteinführung/
 Launch:
 ~04 / 2000



LARGE-Duo-Pack-new design (Externe Ölpumpe / external oil pump)



**POS 880: Solenoid valve
In oil return piping**

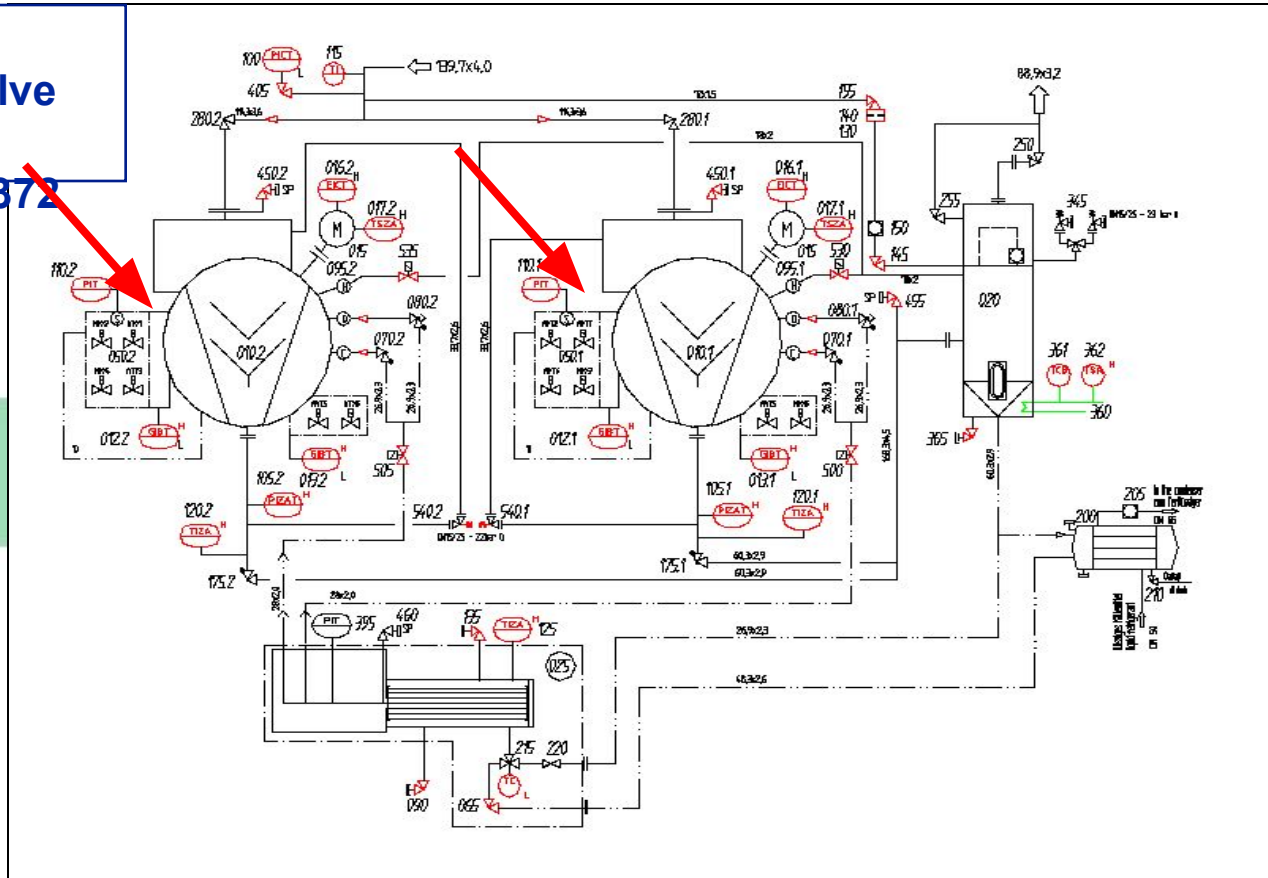
**Stop/Check valve DN80
with linear ball bearings**

- ~11/ 2002:
- Ölversorgung Ausgleichkolben (Anschluss „D“) ist pumpenlos
 - oil supply balance piston (port „D“) not with oil pump-pressure

Medium Duo-Pack

Interne Ölpumpe (alte Version)/ internal oil pump (old version)

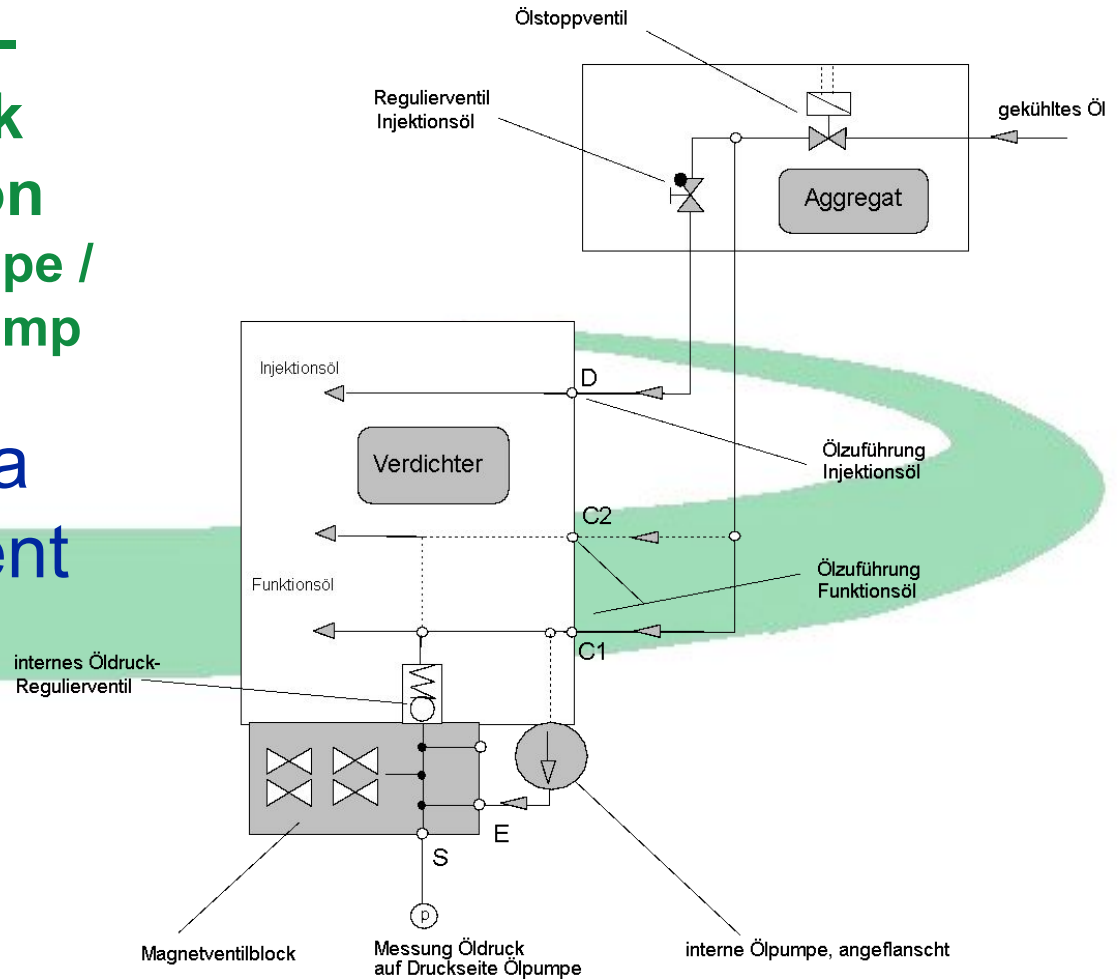
Standard Solenoid valve block
ID: 501 298 372



**MEDIUM -
 DUO-Pack
 Old Version
 Interne Ölpumpe /
 Internal oil pump**

**Schaltschema
 Oil management**

MD11

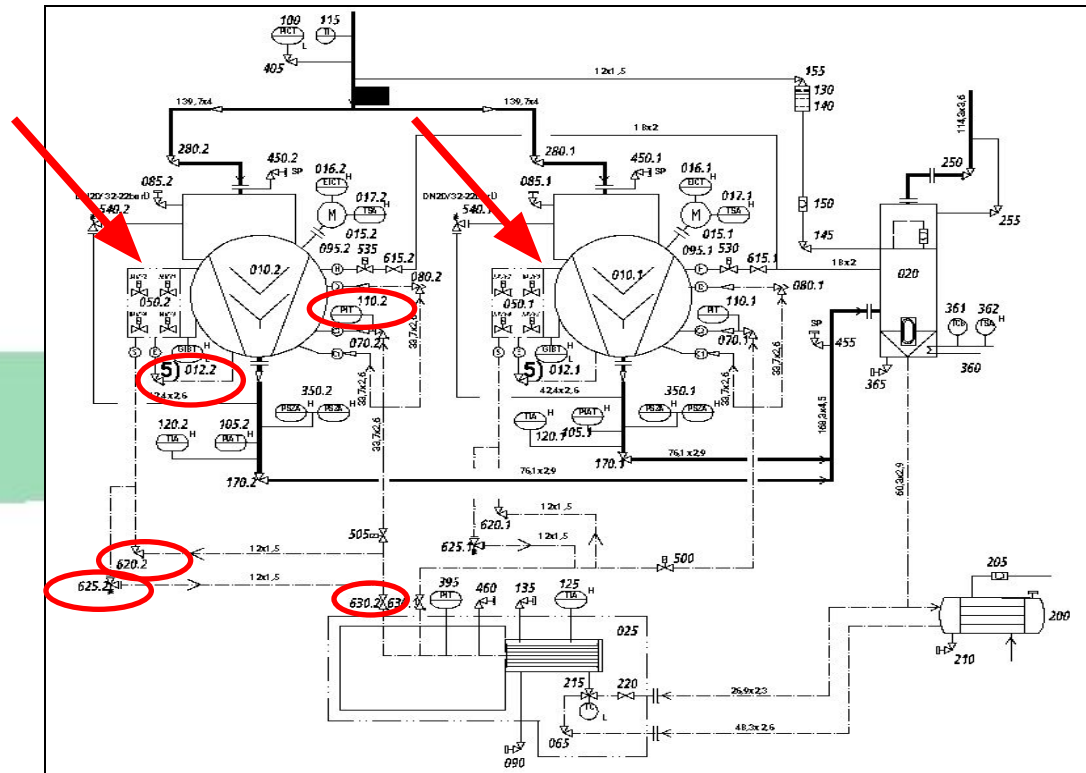


Medium Duo-Pack

Interne Ölpumpe (neue Version)/ internal oil pump (new version)

INTRODUCTION: 09 /
2001

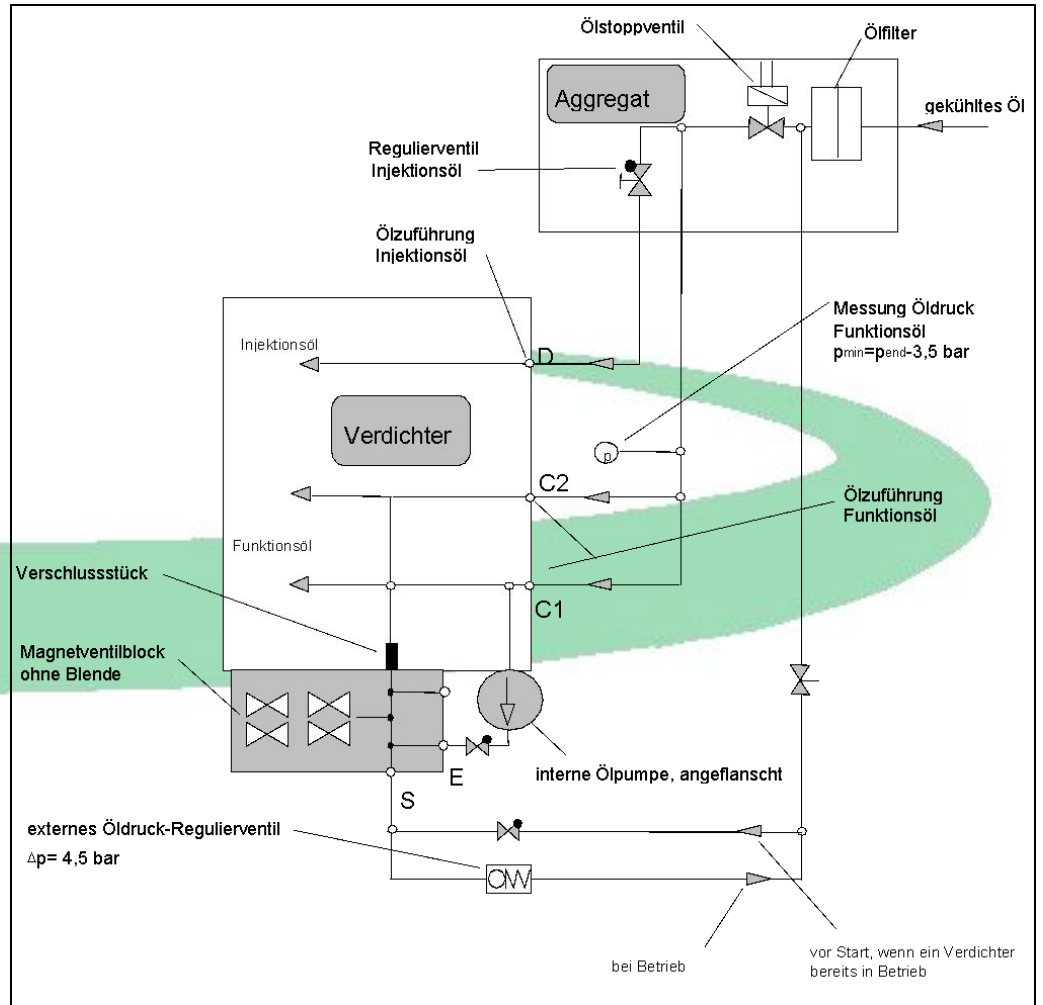
- Magnetventilblock ohne Blende/
Solenoid valve block without
orifice
- Pos 110– new position
Öldrucksensor-oil pressure
sensor
- Pos 630
Absperrventil/ stop
- Pos 620
Rückschlagventil / check
valve
- Pos 625
Öldruckreguliertventil/
oil pressure regulating valve
- Leitung E (&
Rückschlagventil)
Piping E (& check valve)



**MEDIUM -
DUO-Pack
NEW VERSION
Interne Ölpumpe /
Internal oil pump**

**Schaltschema
Oil management**

MD11-R1

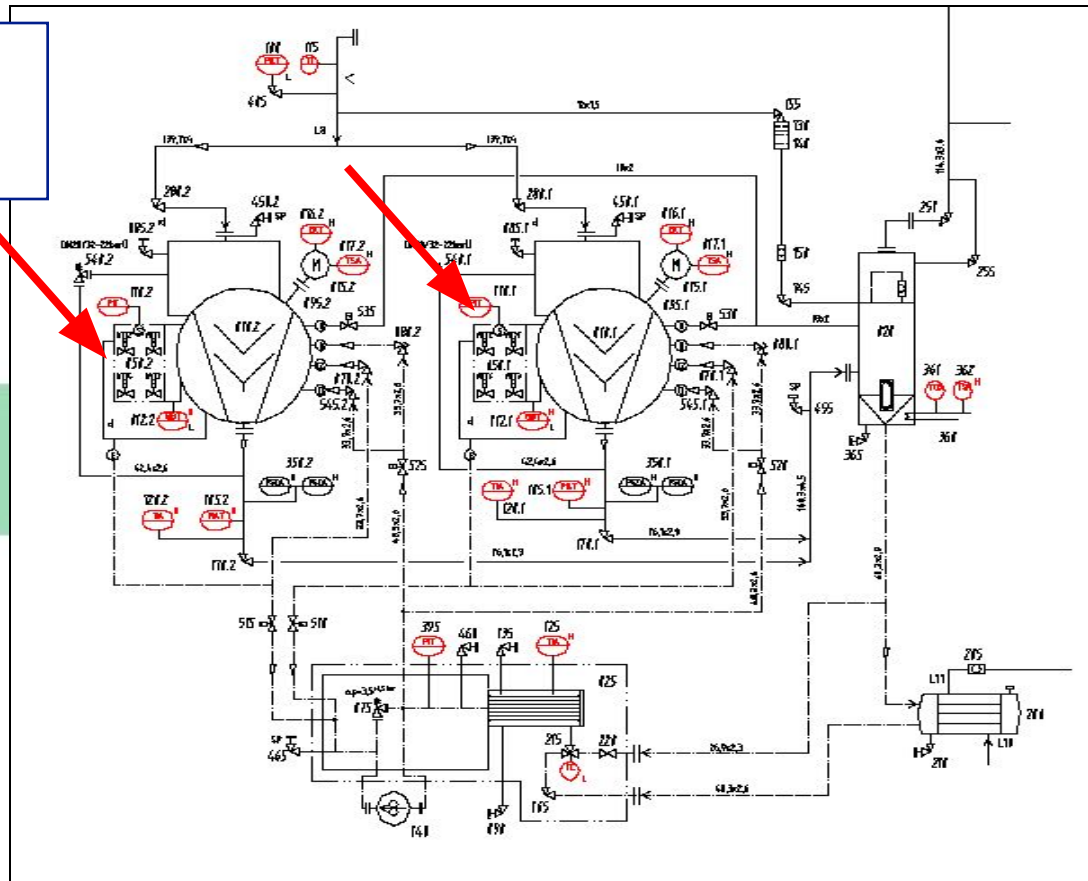


Medium Duo-Pack

Externe Ölpumpe (alte Version)/ external oil pump (old version)

Standard Solenoid valve block

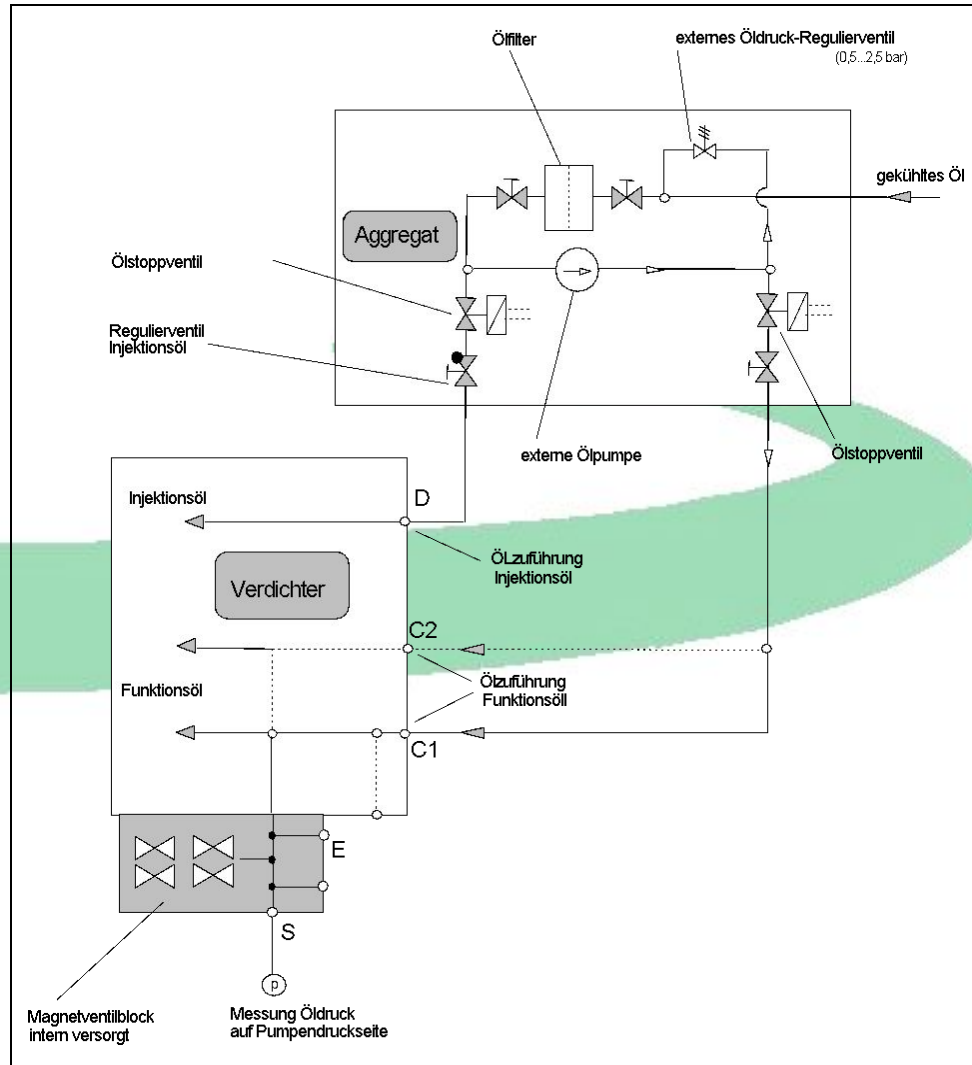
ID: 501 298 372



**MEDIUM -
 DUO-Pack
 OLD VERSION
 Externe Ölpumpe /
 External oil pump**

**Schaltschema
 Oil management**

MD12

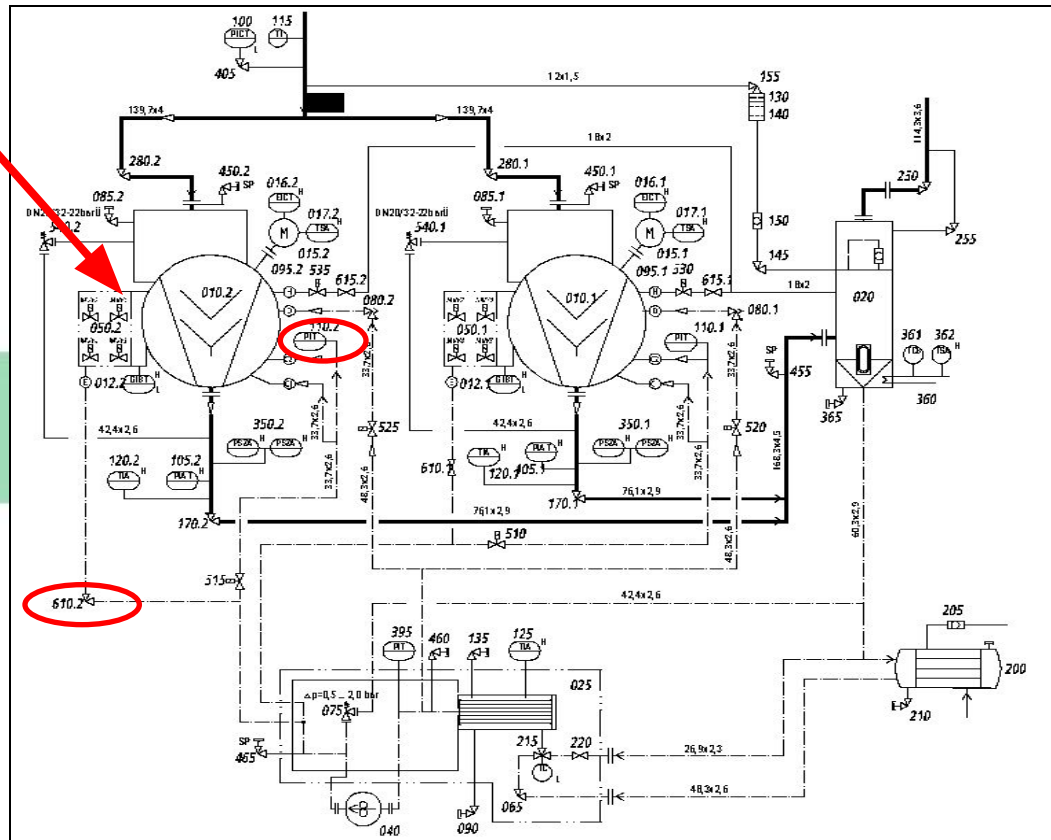


Medium Duo-Pack

Externe Ölpumpe (neue Version)/ external oil pump (new version)

INTRODUCTION: 09 /
2001

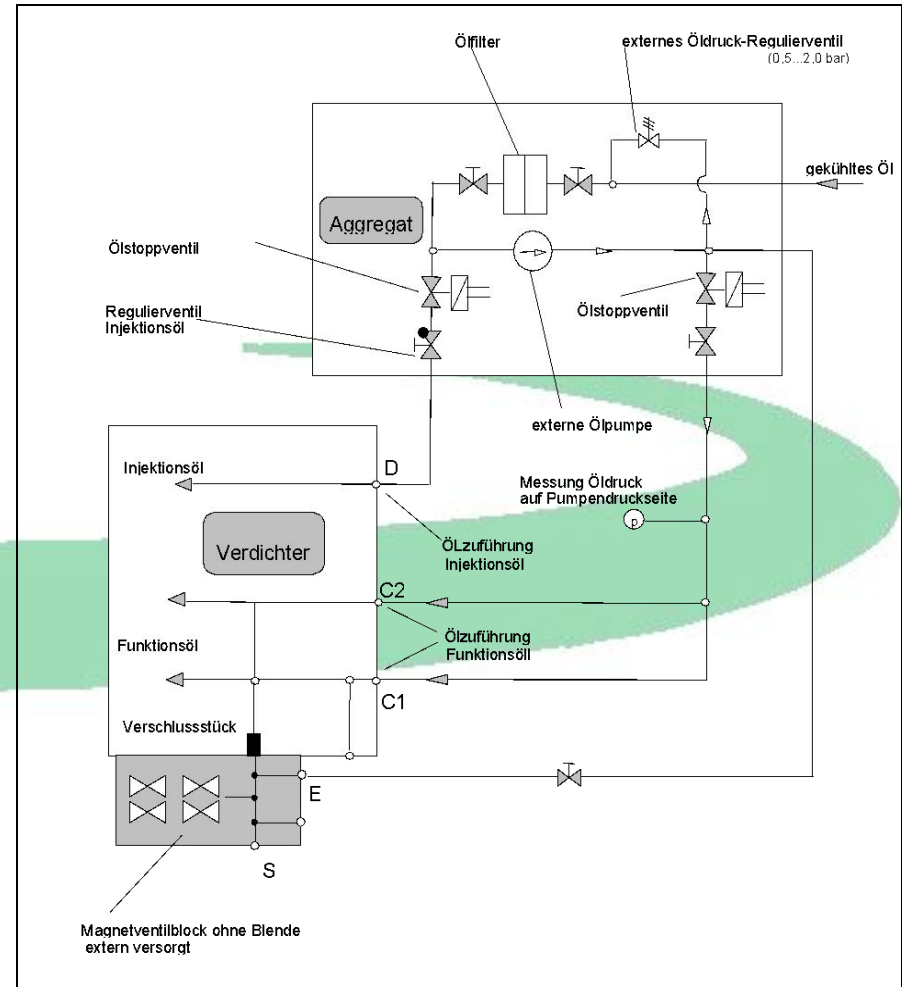
- Magnetventilblock ohne Blende/
Solenoid valve block without
orifice
- Pos 110- new position
Öldrucksensor-oil pressure
sensor
- Pos 610
Absperrventil/ stop
valve



**MEDIUM -
DUO-Pack
NEW VERSION
Externe Ölpumpe /
External oil pump**

**Schaltschema
Oil management**

MD12-R1



SMALL DUO-Pack

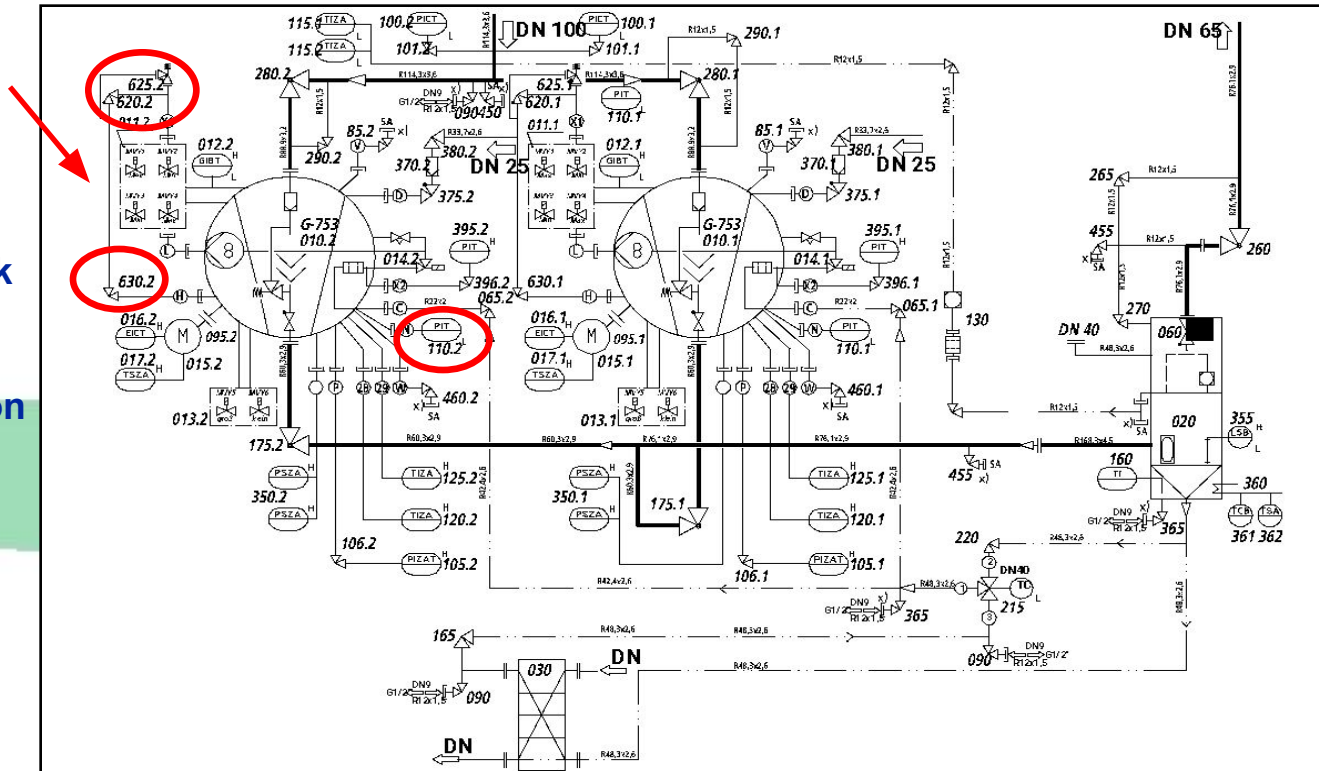
Interne Ölpumpe (neue Version)/ internal oil pump (new version)

INTRODUCTION

:

09 / 2001

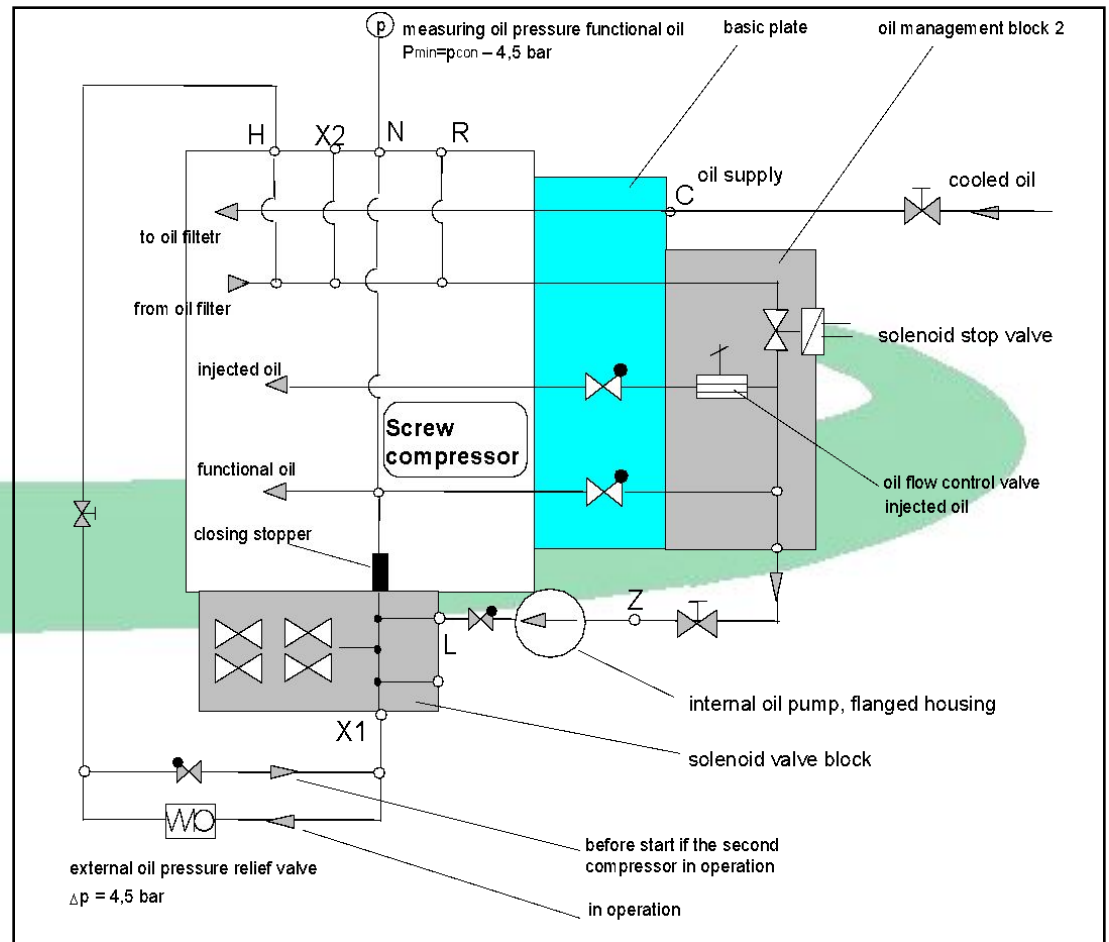
- Magnetventilblock ohne Blende/
- Solenoid valve block without orifice
- Pos 110- new position Öldrucksensor oil pressure sensor
- Pos 620/625 Check valve/ regulating valve
- Pos 630 stop valve



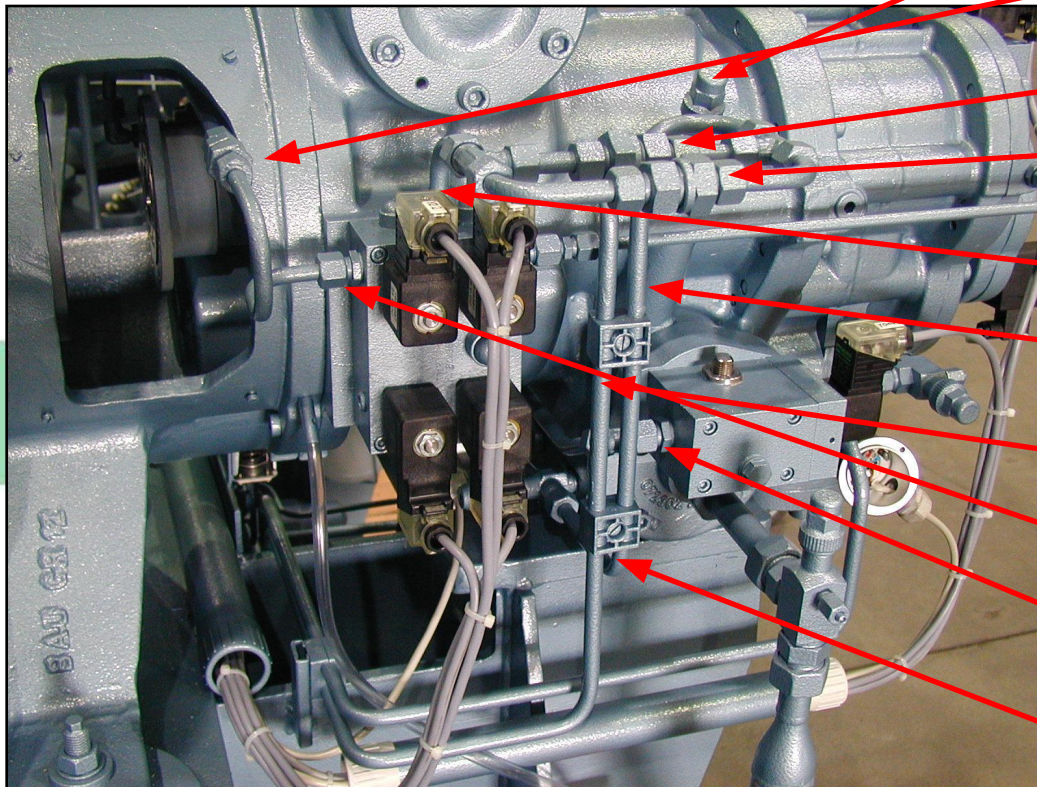
**SMALL -
DUO-Pack
NEW VERSION
interne Ölpumpe /
internal oil pump**

**Schaltschema
Oil management**

SD11-R1



**SH-DUO-Pack-NEW VERSION
 SD11-R1**



- N
- Check valve
- Check valve
- Oil pressure relief valve; 4,5 bar
- X1
- to X1
- to N for measuring oil pressure
- L (from oil pump)
- to oil pump
- to connection H

SMALL Duo-Pack

Externe Ölpumpe (neue Version)/ external oil pump (new version)

INTRODUCTION

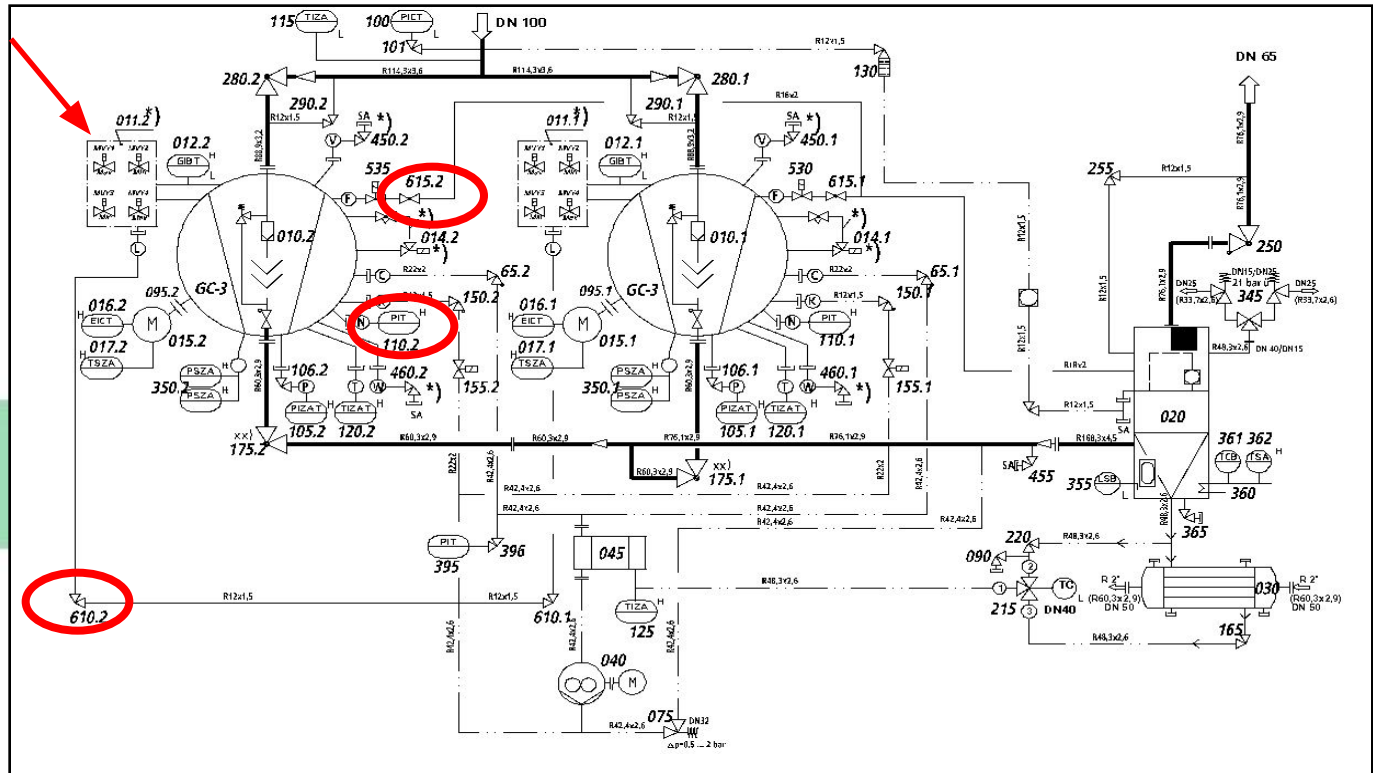
N:

09 / 2001

- MVBL ohne Blende/
- Sol.valve block without orifice

- Pos 110:
•new position oil pressure sensor

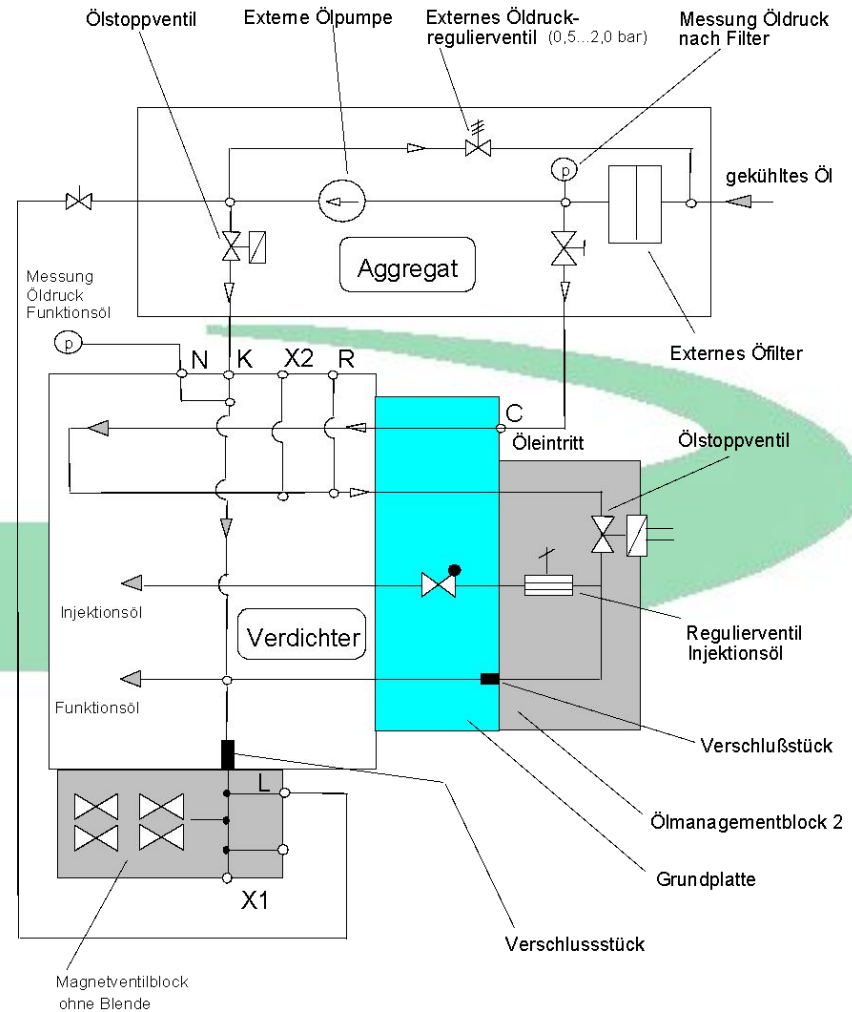
- Pos 610 / 615 stop valves



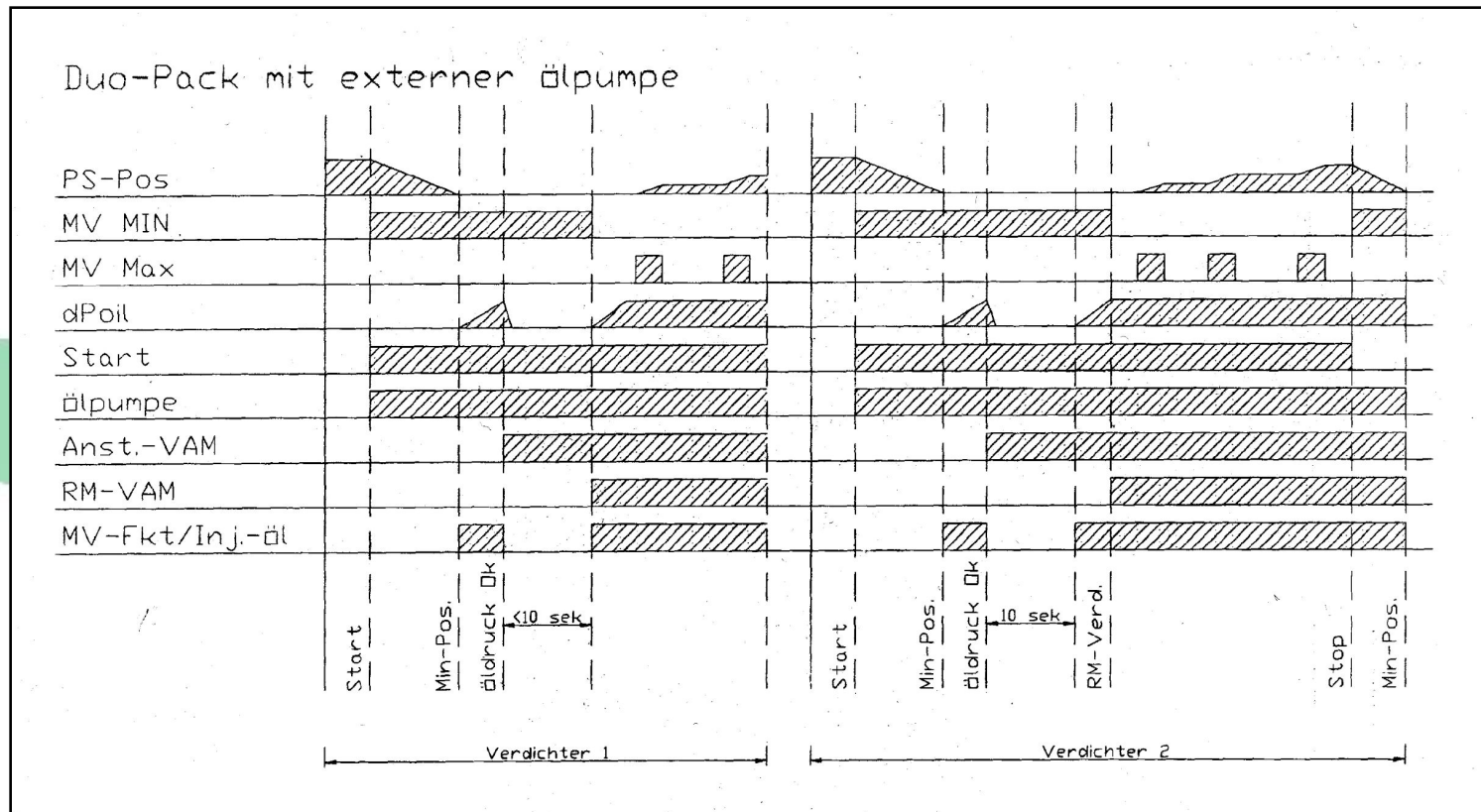
**SMALL -
 DUO-Pack
 NEW VERSION
 Externe Ölpumpe /
 External oil pump**

**Schaltschema
 Oil management**

SD12-R1

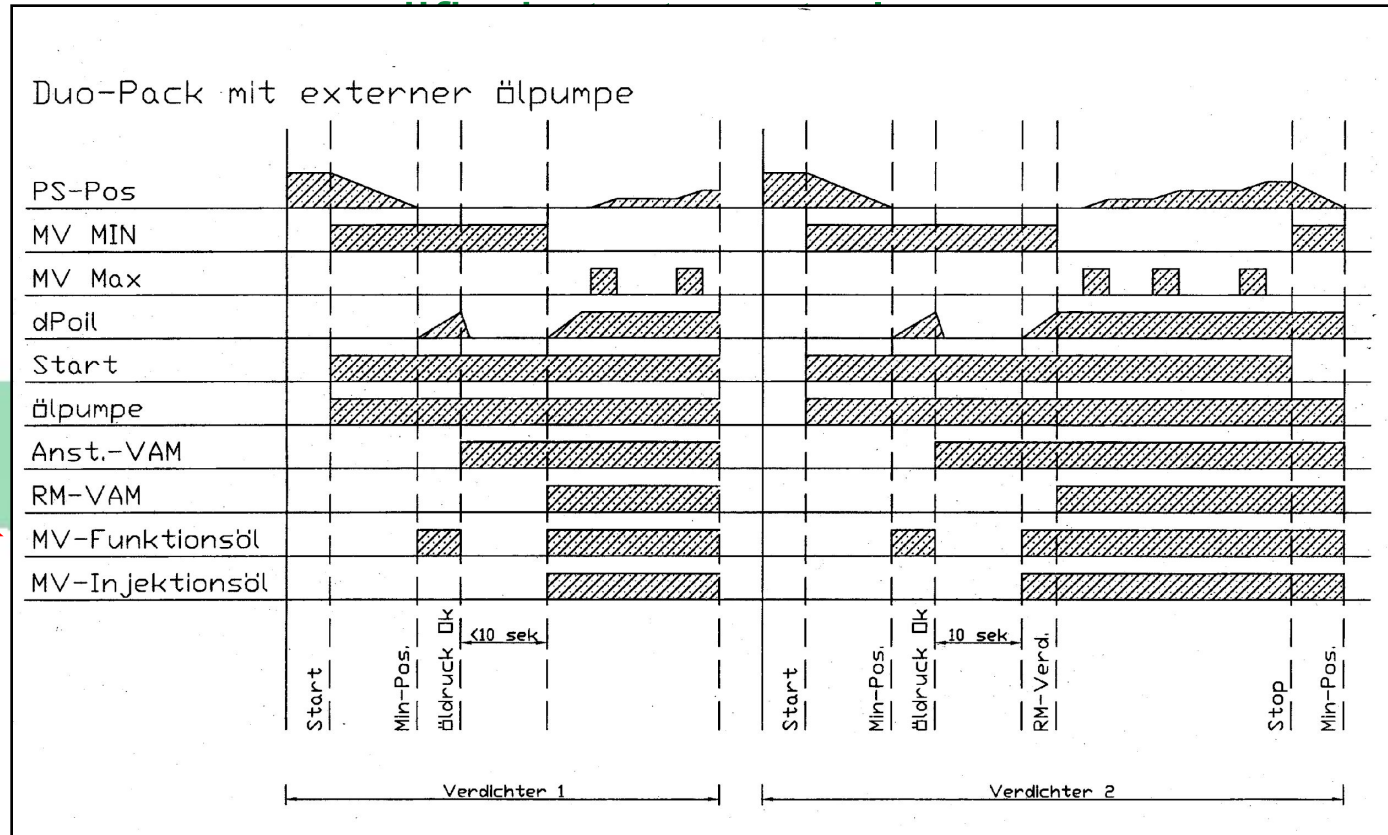


LARGE-Duo-Pack - ext. oilpump - start control

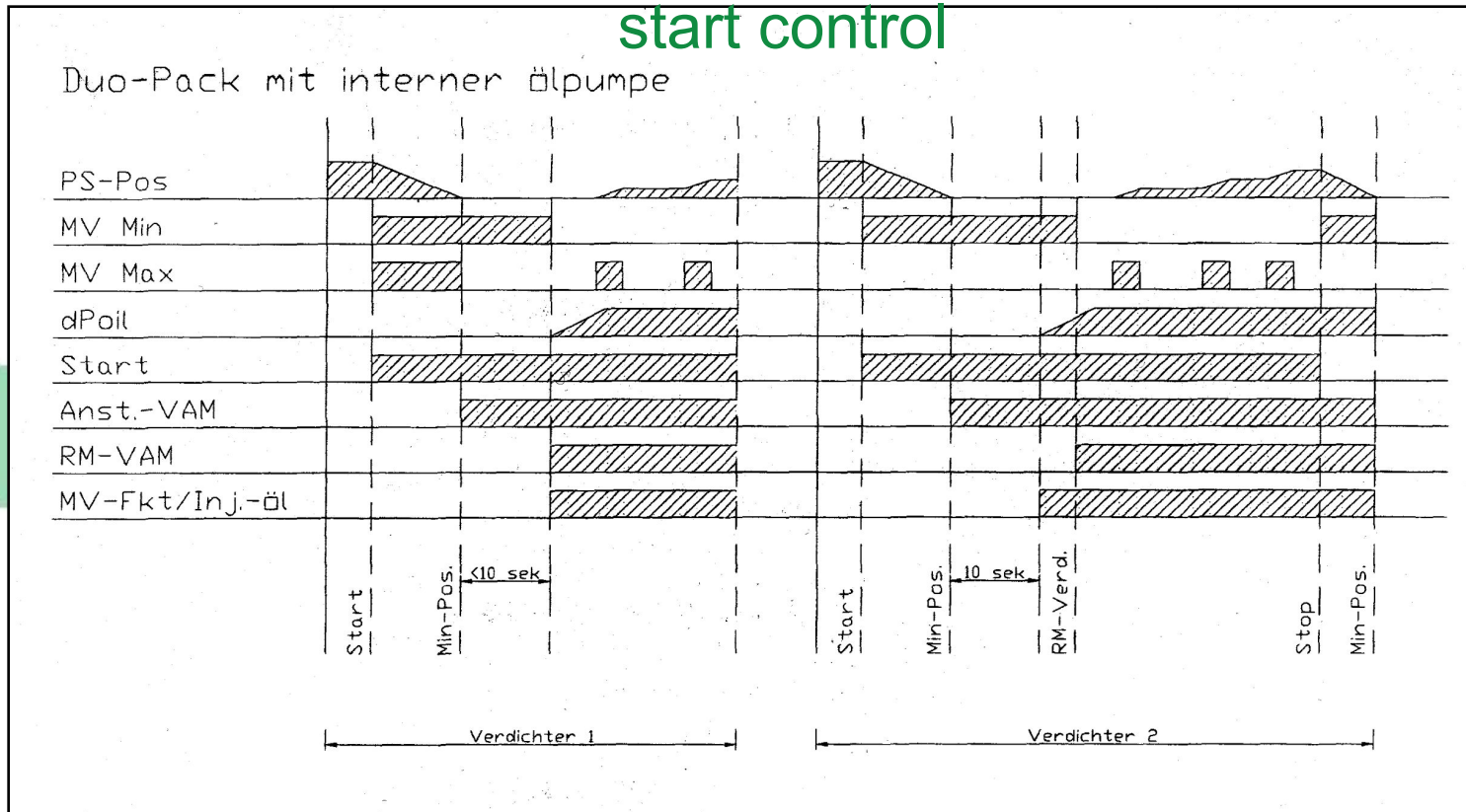


LARGE-Duo-Pack – external oil pump

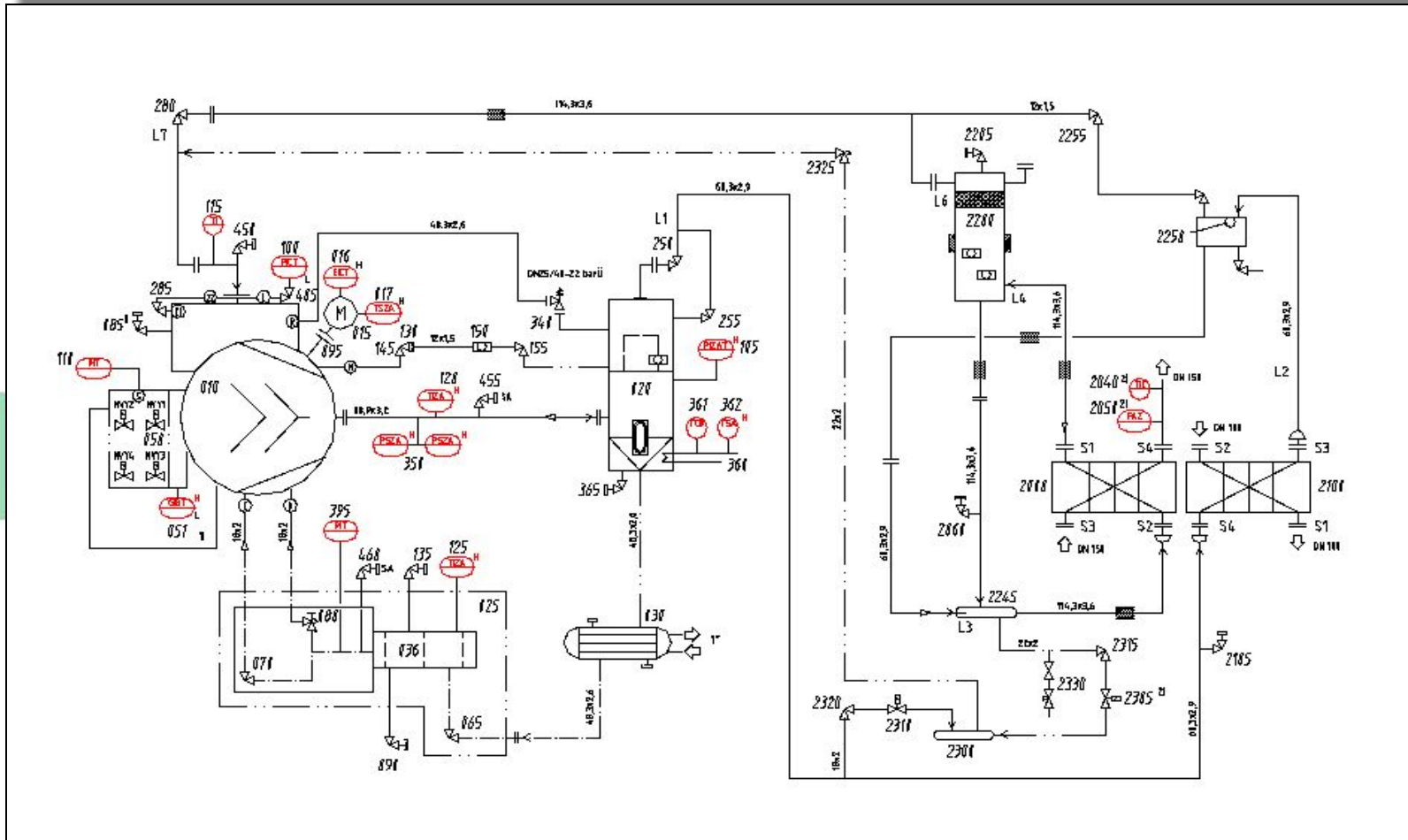
Einführung/
 Introduction
 :
 ~09 / 2002



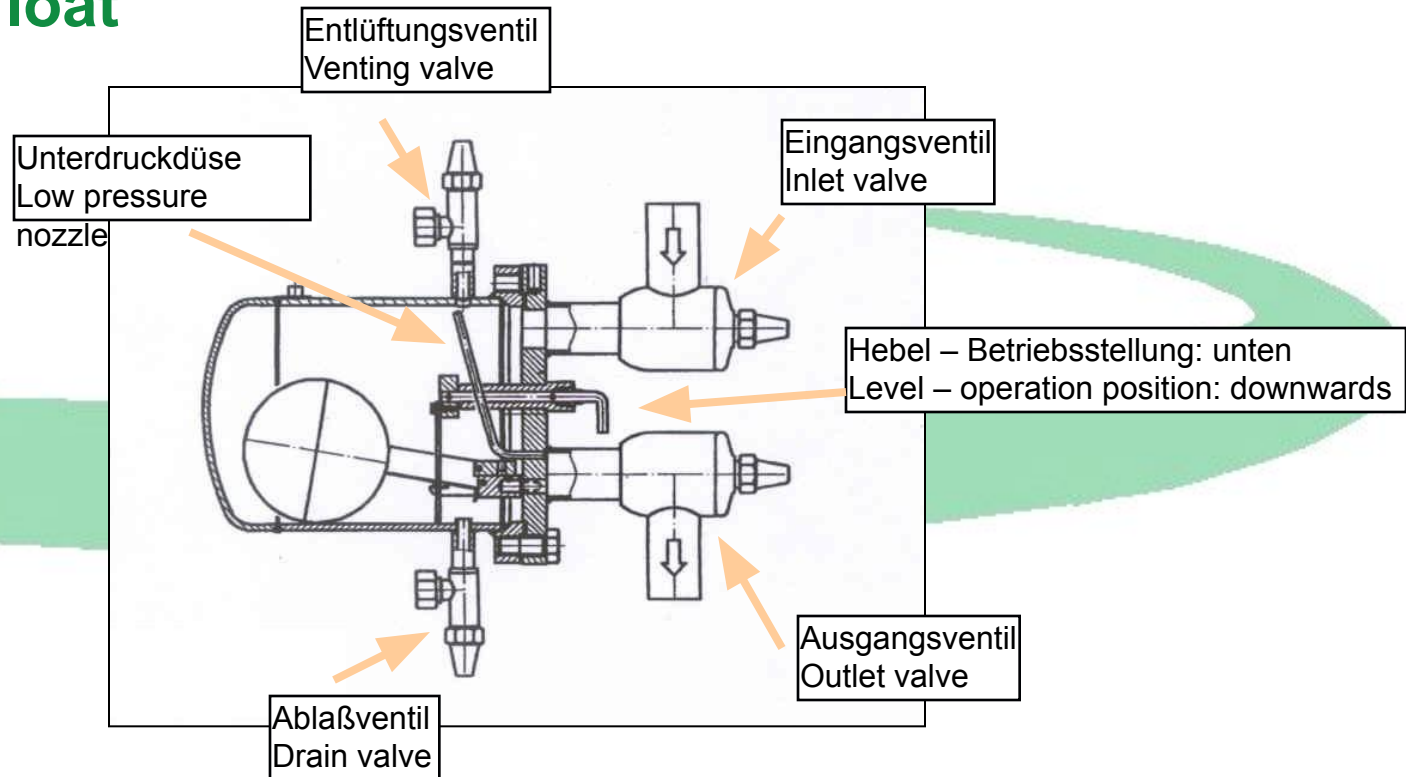
Duo-Pack – internal oil pump start control



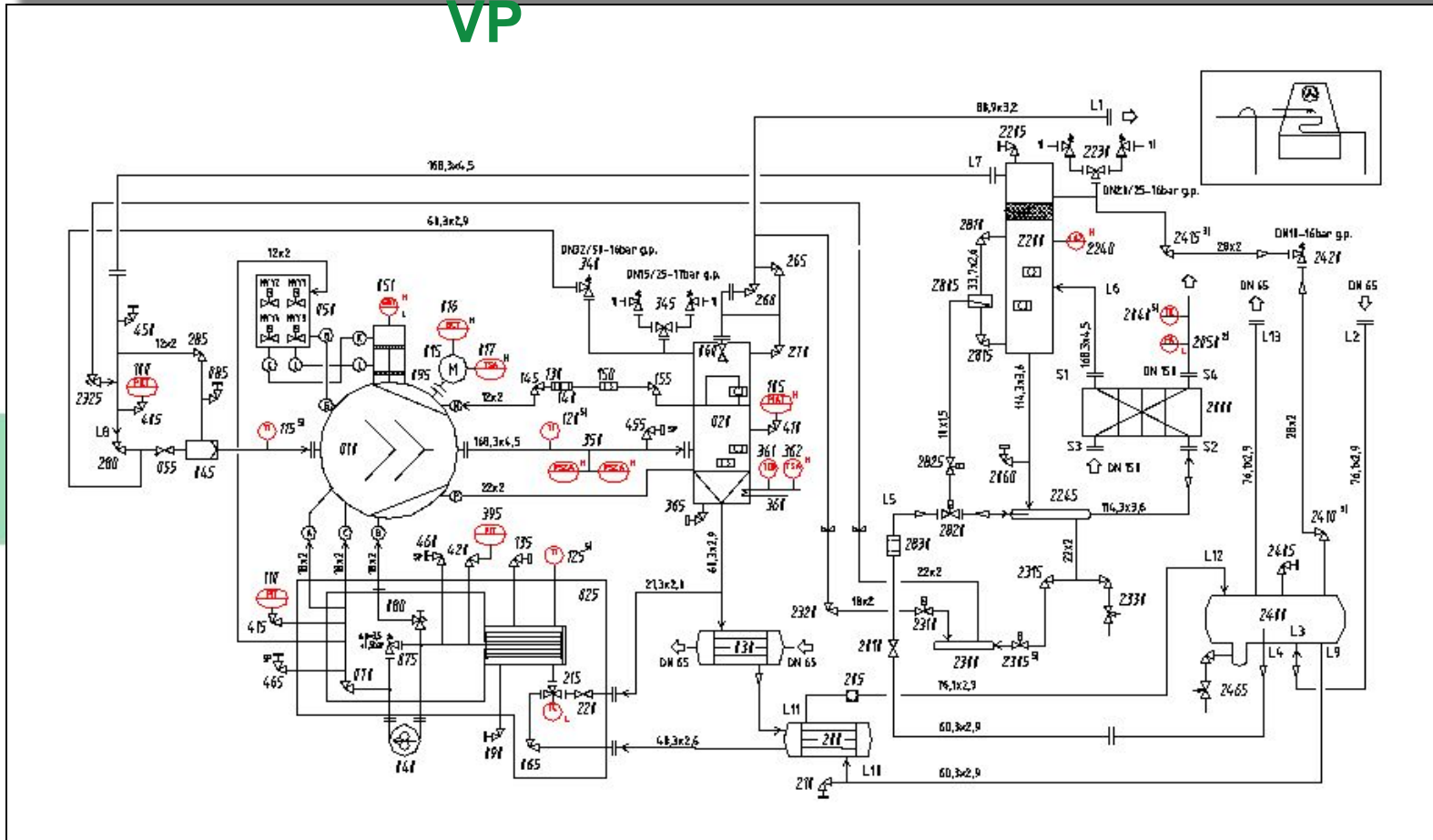
FKS /Chiller – FX



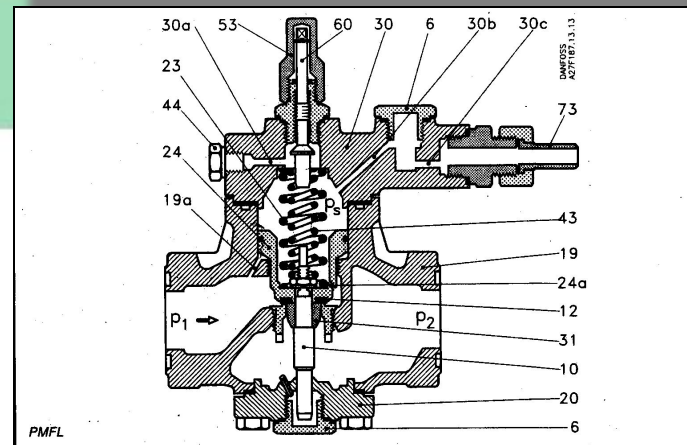
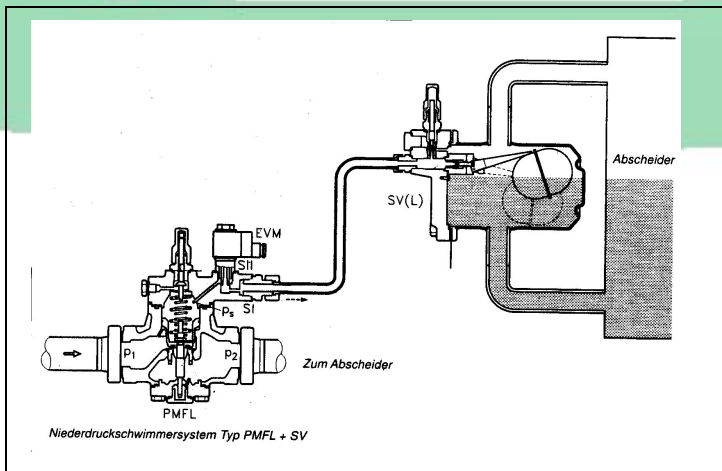
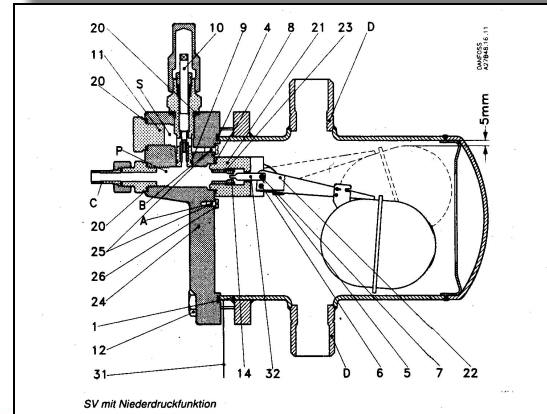
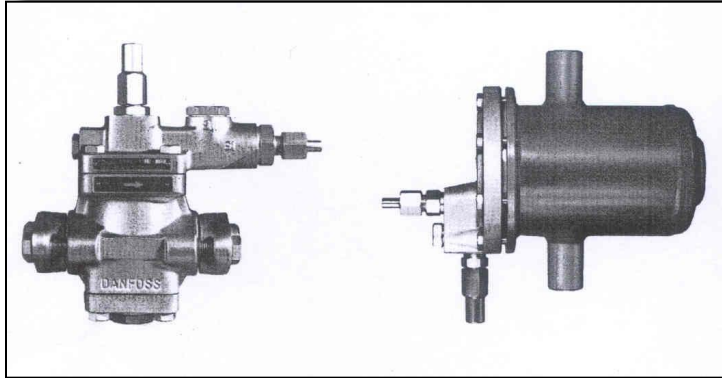
Hochdruckschwimmer /High pressure float



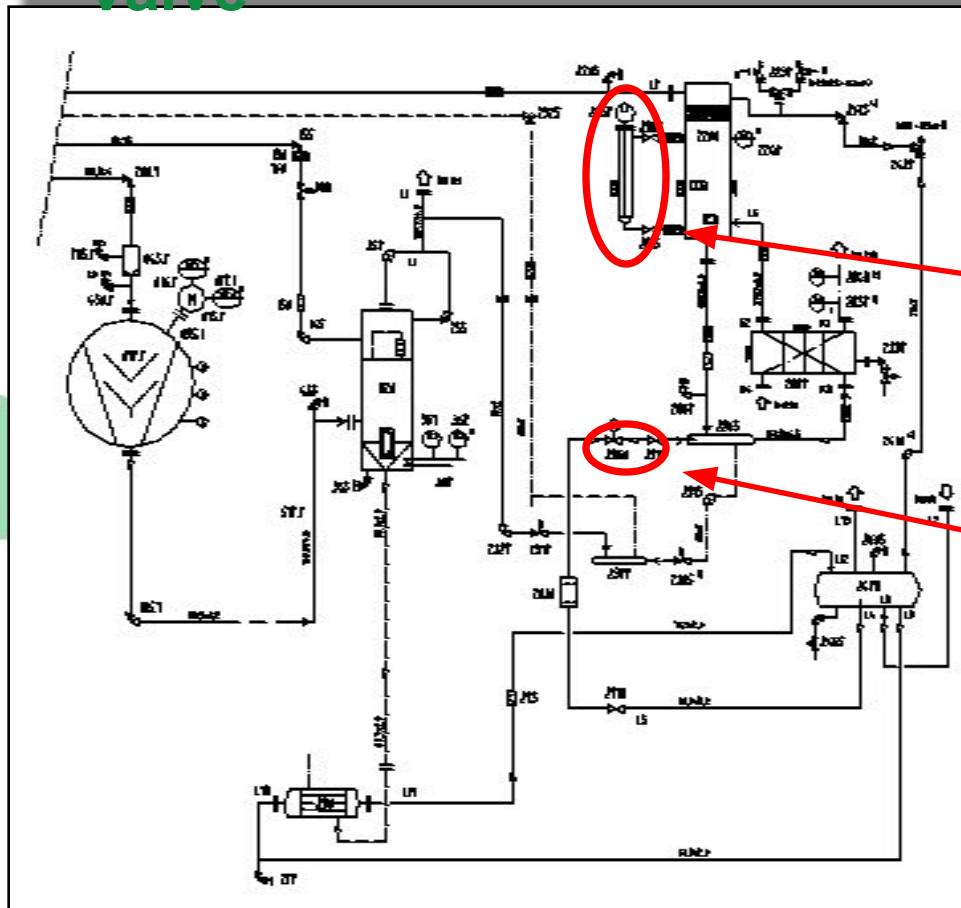
FKS /Chiller – FX VP



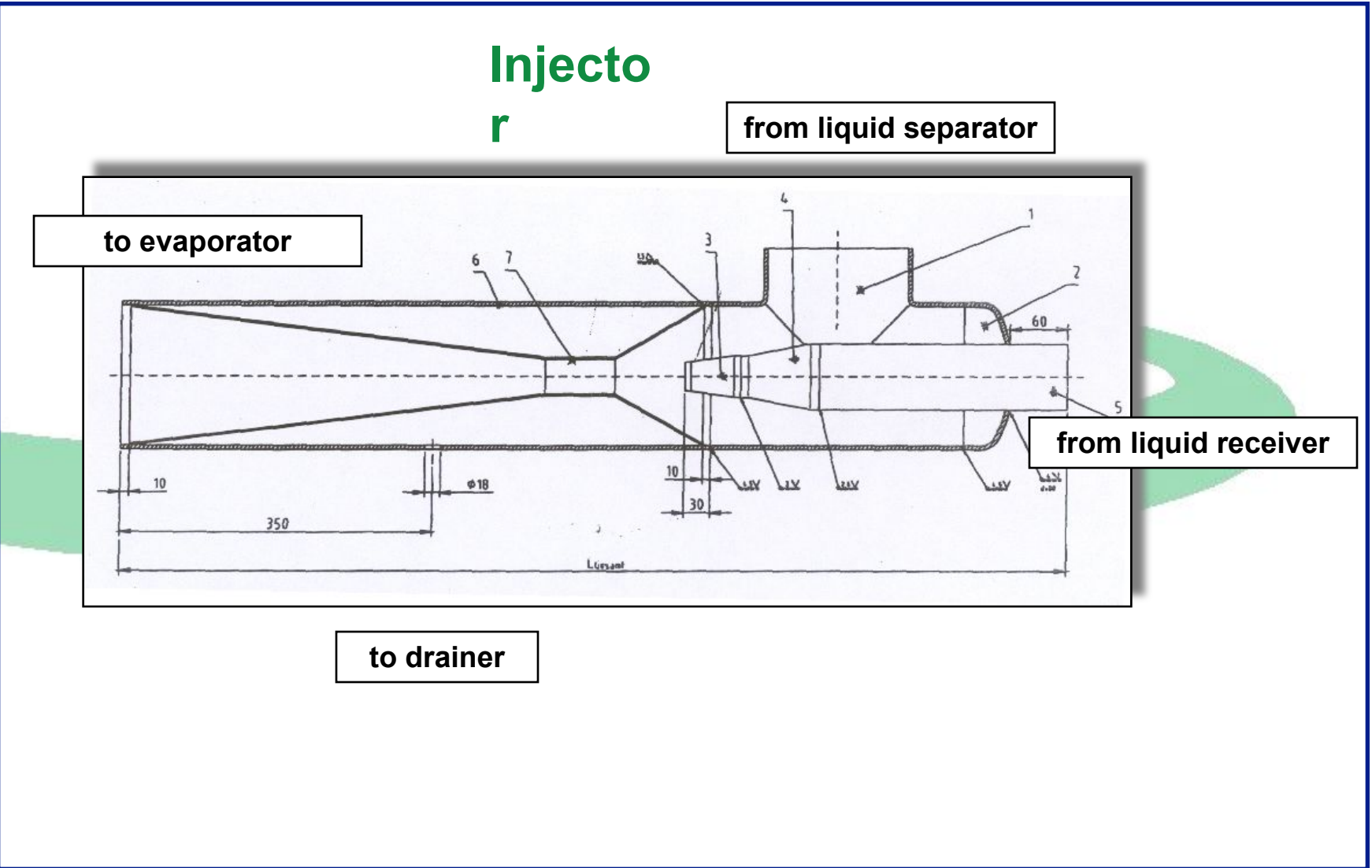
Niveauregler /liquid level control - PMFL &



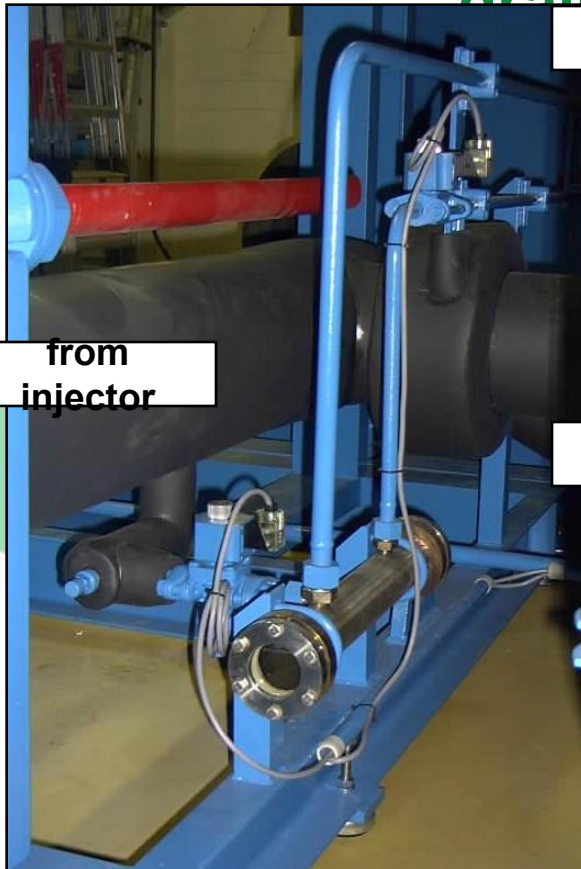
Niveauregler /liquid level control – RTK motor valve



Injector



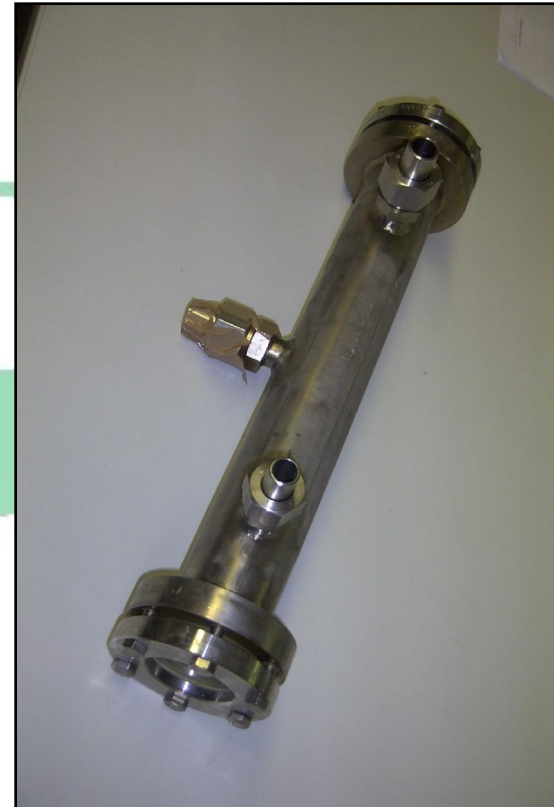
Entöler / drainer



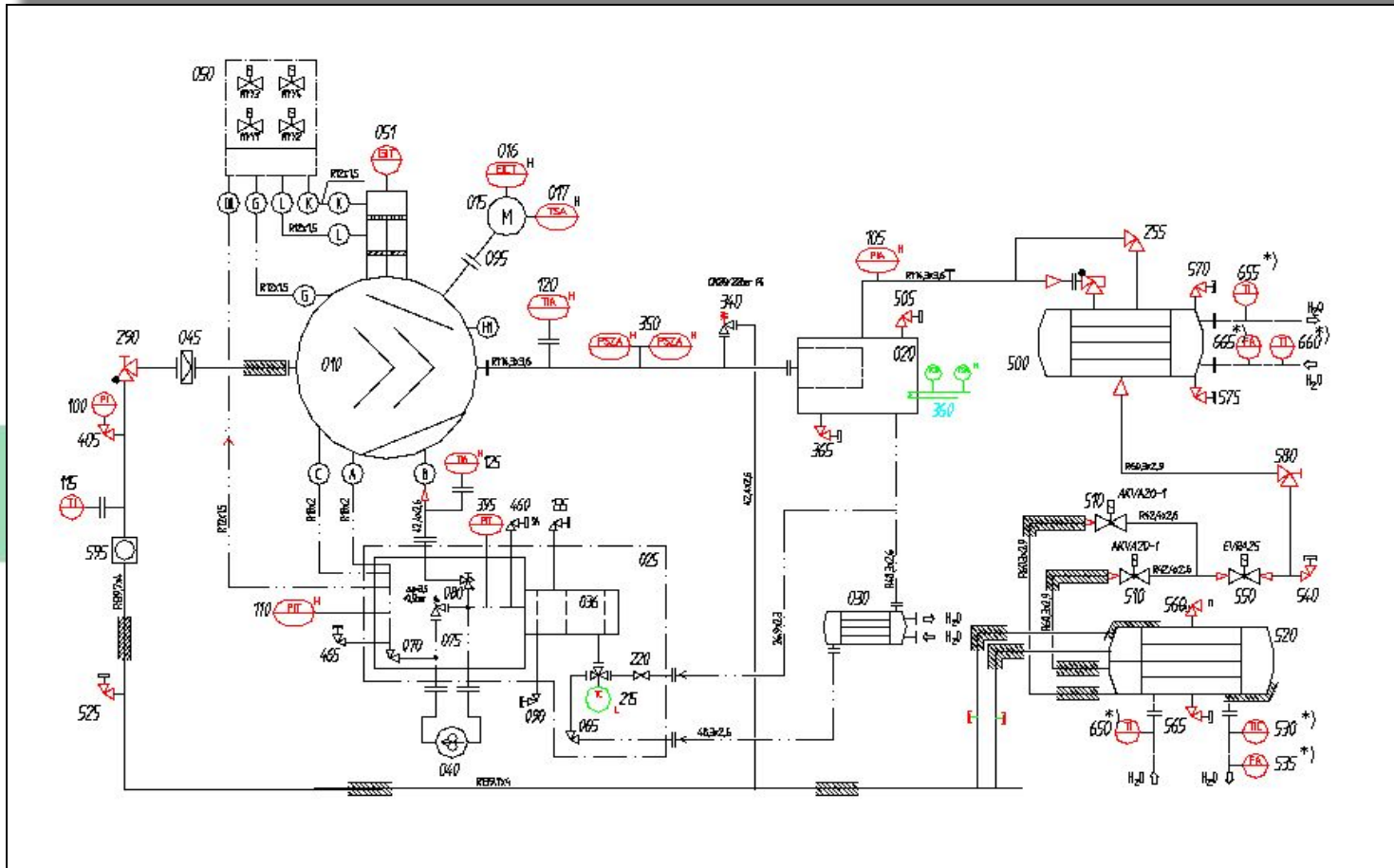
from
injector

Hot gas

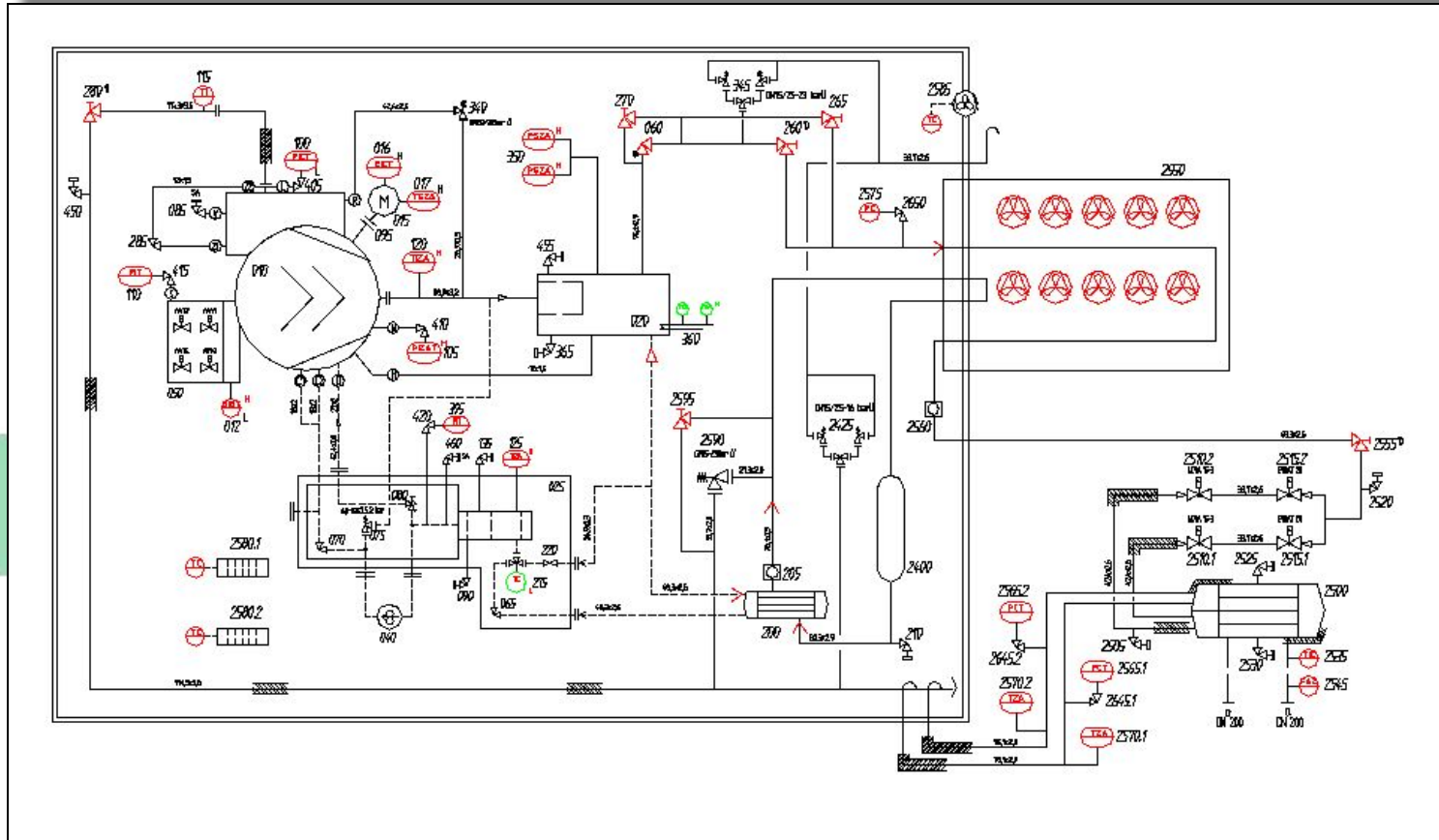
to suction



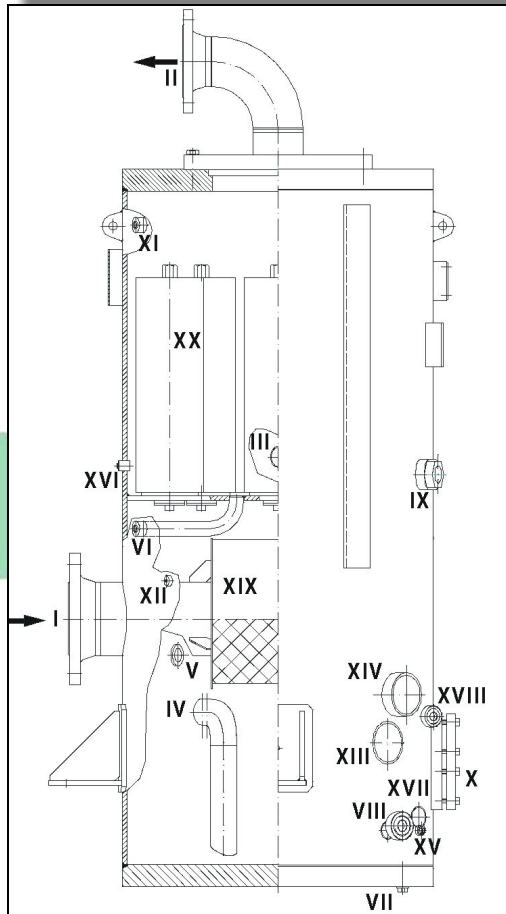
FKS /Chiller – DX



FKS /Chiller – DX

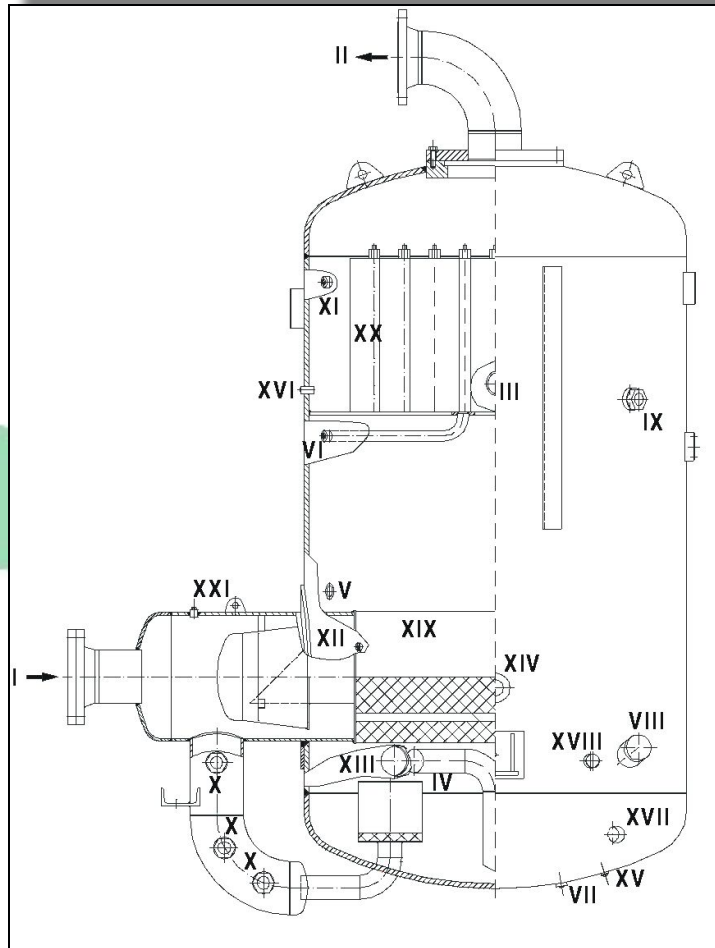


Ölabscheider / oil separator: Ø508, Ø711,



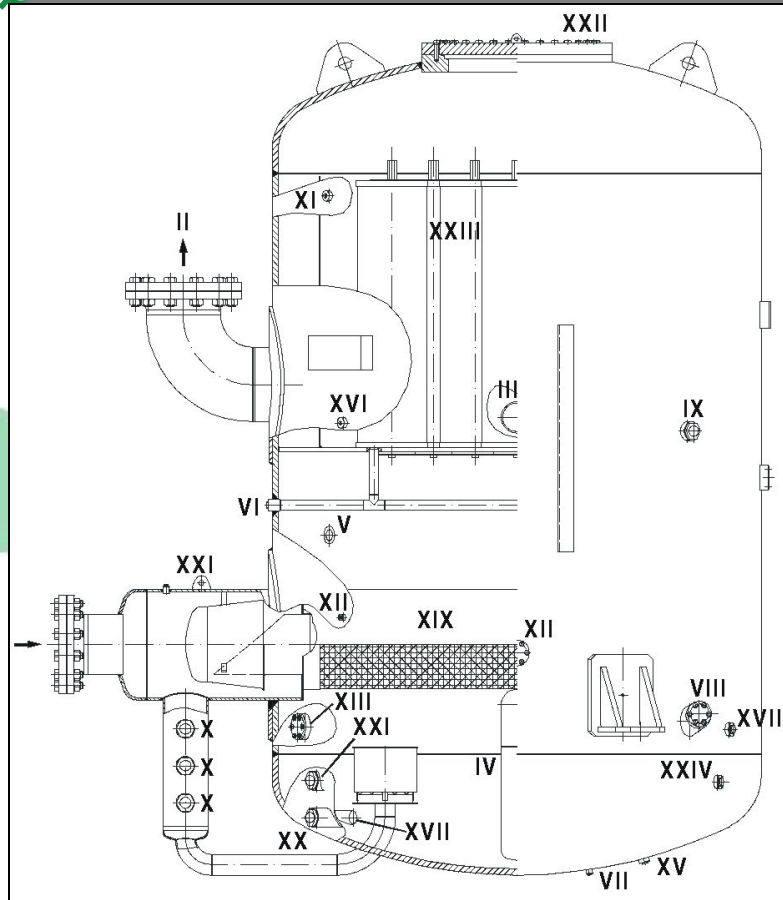
I	Kältemiteleintritt	Refrigerant inlet
II	Kältemittelaustritt	Refrigerant outlet
III	Überströmventil/ Sicherheitsventil	Overflow valve/ Safety valve
IV	Ölaustritt zum Ölkühler	Oil outlet to oil cooler
V	Gasschwingungsschutz	Gas pulsation protection
VI	Ölrückführung	Oil return
VII	Ölablaß	Oil drain
VIII	Ölheizung	Oil heater
IX	Schauglas – Ölfeinabscheidestufe	Sight glass – oil fine separation stage
X	Schauglas – Ölniveau Ölsammler	Sight glass – oil level in oil receiver
XI	Meßleitung/ Umgehungsleitung	Measuring line/ bypass line
XII	Drucktransmitter Enddruck	Pressure transm. /discharge pressure
XIII	Niveaufächter MIN.I	Level controller MIN.I
XIV	Niveaufächter MAX.I	Level controller MAX.I
XV	Öltemperatur – Ölsammler	Oil temperature – oil receiver
XVI	Sicherheitsdruckbegrenzer	Safety pressure limiter
XVII	Niveaufächter MIN.II	Level controller MIN.II
XVIII	Niveaufächter MAX.II	Level controller MAX.II
XIX	Agglomerator	Agglomerator
XX	Feinabscheidepatronen	Fine separation cartridges

Ölabscheider / oil separator: Ø1016, Ø1200,



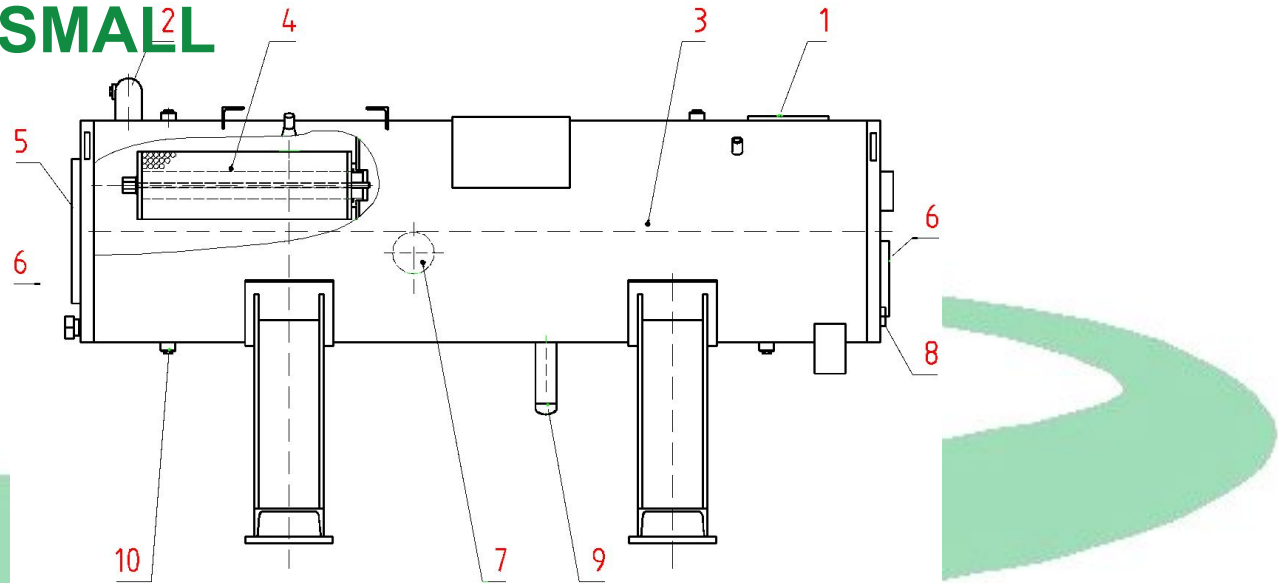
I	Kältemiteleintritt	Refrigerant inlet
II	Kältemittelaustritt	Refrigerant outlet
III	Überströmventil/ Sicherheitsventil	Overflow valve/ Safety valve
IV	Ölaustritt zum Ölkühler	Oil outlet to oil cooler
V	Gasschwingungsschutz	Gas pulsation protection
VI	Ölrückführung	Oil return
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VIII	Ölheizung	Oil heater
IX	Schauglas - Ölfeinabscheidestufe	Sight glass – fine separation stage
X	Schauglas – Ölniveau Ölsammler	Sight glass – oil level in oil receiver
XI	Meßleitung/ Umgehungsleitung	Measuring line/ bypass line
XII	Drucktransmitter Enddruck	Pressure transm./disch. pressure
XIII	Niveaufwächter MIN.I	Level controller MIN.I
XIV	Niveaufwächter MAX.I	Level controller MAX.I
XV	Öltemperatur - Ölsammler	Oil temperature – oil receiver
XVI	Sicherheitsdruckbegrenzer	Safety pressure limiter
XVII	Niveaufwächter MIN.II	Level controller MIN.II
XVIII	Niveaufwächter MAX.II	Level controller MAX.II
XIX	Agglomerator	Agglomerator
XX	Feinabscheidepatronen	Fine separation cartridges
XXI	Endtemperatur	Discharge temperature

Ölabscheider / oil separator: Ø1600, Ø1800, Ø2000, Ø2200



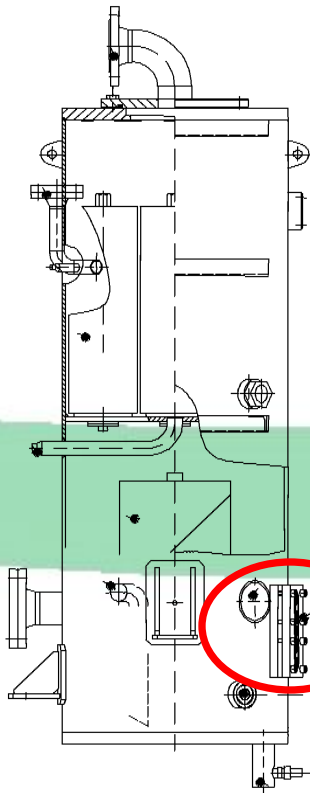
I	Kältemiteleintritt	Refrigerant inlet
II	Kältemittelaustritt	Refrigerant outlet
III	Überströmventil/ Sicherheitsventil	Overflow valve/ Safety valve
IV	Ölaustritt zum Ölkühler	Oil outlet to oil cooler
V	Gasschwingungsschutz	Gas pulsation protection
VI	Ölrückführung	Oil return
VII	Ölablaß	Oil drain
VIII	Ölheizung	Oil heater
IX	Schauglas - Ölfineabscheidestufe	Sight glass - fine separation stage
X	Schauglas - Ölsammler	Sight glass - oil receiver
XI	Meßleitung/ Umgehungsleitung	Measuring line/ bypass line
XII	Drucktransmitter Enddruck	Pressure transm./disch.pressure
XIII	Niveaufächter MIN.I	Level controller MIN.I
XIV	Anschluß Niveaufächter MAX.I	Connection, level controller MAX.I
XV	Öltemperatur - Ölsammler	Oil temperature - oil receiver
XVI	Sicherheitsdruckbegrenzer	Safety pressure limiter
XVII	Niveaufächter MIN.II	Level controller MIN.II
XVIII	Niveaufächter MAX.II	Level controller MAX.II
XIX	Agglomerator	Agglomerator
XX	Feinabscheidepatronen	Fine separation cartridges
XXI	Endtemperatur	Discharge temperature
XXII	Deckel (Austausch Abscheidepatr.)	Cover(replacement of cartridges)

Ölabscheider / oil separator: SMALL

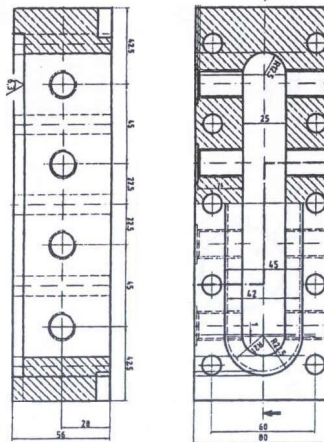


Item	Designation	Bezeichnung	Item	Designation	Bezeichnung
1	refrigerant inlet	Kältemiteleintritt	6	oil level indicator	Ölniveanzeige
2	refrigerant outlet	Kältemittelaustritt	7	level switch connection	Ölniveauschalter- anschluß
3	agglomerator/ demister (not shown in fig.1)	Agglomerator	8	oil heater connection	Ölheizungsanschluß
4	oil fine separation cartridge	Ölfeinabscheidepatrone	9	oil outlet to oil cooler	Ölaustritt zum Kühler
5	cover	Deckel	10	main oil return from oil fine separation section	Ölrückführung von Feinabscheideteil

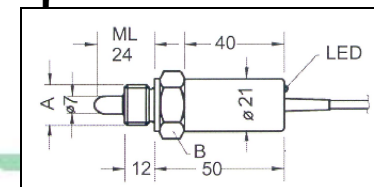
Niveauanzeiger - optoelektronisch / level switches - optoelectrical



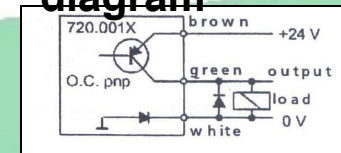
Sight glass adapter



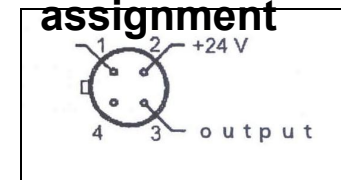
**senso
r**



**Connection
diagram**

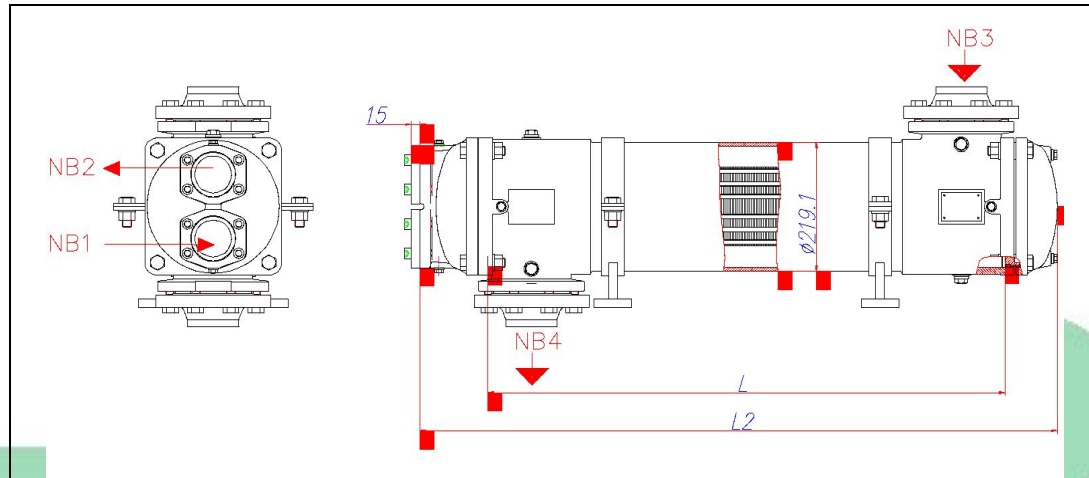


**Pin
assignment**

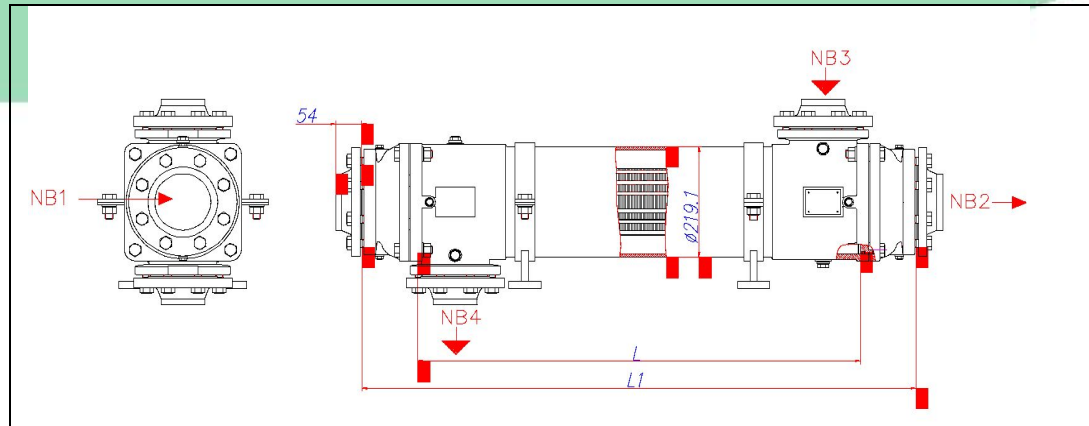


Ölkühler wassergekühlt / oil cooler water

cooled
Two Pass
 Tubeside
 (KS20):



One Pass
 Tubeside (KS20):



Baureihenkenzeichnung / Designation code

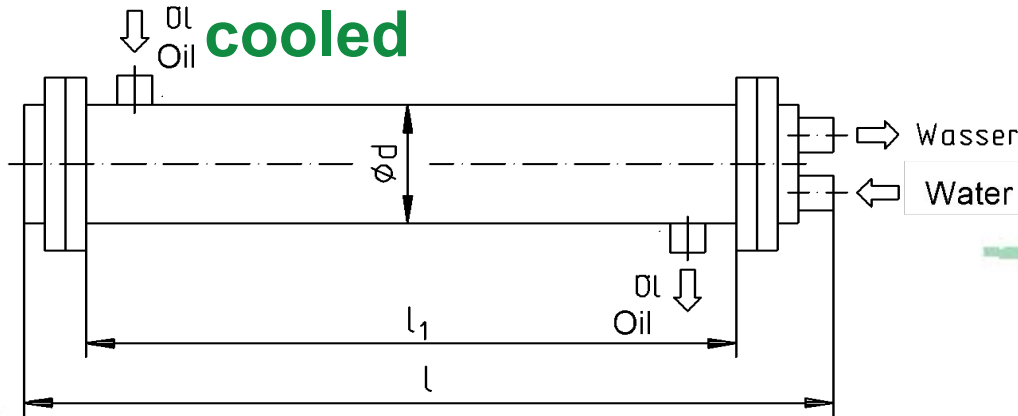
K	S	1	2	-	A	E	P	-	8	2	2	L	1000
LÄNGE ZWISCHEN ROHRPLATTEN / DISTANCE BETWEEN TUBEPLATES L [mm] [400-3600]													
OPTION: BESCHICHTUNG / COATING													
OPTION: TURBULATOREN / TURBULATORS													
ZAHL DER UMLENKUNGEN / NUMBER OF BAFFLES (0/1/2/3/4)													
EIN- ZWEI FLUTIG / PATH TUBESIDE (1/2)													
RIPPENTEILUNG / FIN PITCH LT [mm] (ONLY LAST FIGURE: 0.8 / 1.1 / 1.4)													
RUNDRINGE / MATERIAL OF O-RING / SEALING STRIPS (NBR / HNBR / VITON / NEOPRENE / EPDM)													
ROHRMATERIAL / MATERIAL OF TUBES (CUNI / STAINLESS STEEL / TITANIUM)													
DECKELMATERIAL / MATERIAL OF WATERBOX (BRONZE / ALUMINIUM / STEEL FOR REFRIGERANTS, NH3)													
GEHÄUSEDURCHMESSER / SHELL DIAMETER (ONLY THE FIRST TWO FIGURES: DN 125 / DN 200 / DN 250)													
GEHÄUSEMATERIAL / SH (ALUMINIUM)													
BAUREIHE / COOLER SERIES K													

Leistungsdaten / performance data

KS 12		L=400	L=800	L=1200	L=1600	L=2000	L=2600	L=3200	L=3600
exchange area A	m ²	6,80	13,76	20,64	27,52	34,40	47,20	55,04	61,92
volume oil side	l	3,1	5,8	8,4	11,0	13,7	17,6	21,5	24,2
volume water side	l	2,5	3,7	4,8	6,0	7,1	8,8	10,5	11,4
Oil cooling capacity 1) NH ₃	kW	37	85	120					
Heat recovery capacity 2) NH ₃	kW				52	65	85	125	145
KS 20									
Water volume flow	m ³ /h	L=400 4,8	L=800 9,2	L=1200 9,5	L=1600 3,1	L=2000 3,4	L=2600 5,0	L=3200 7,3	L=3600 8,5
exchange area A	m ²	21,17	33,88	50,82	67,76	84,70	110,11	135,52	152,46
volume oil side	l	9,4	14,3	20,9	27,5	34,1	44,0	53,9	60,5
volume water side	l	8,5	10,7	13,5	16,3	19,2	23,4	27,7	29,3
Oil cooling capacity 1) NH ₃	kW	145	195	290					
Heat recovery capacity 2) NH ₃	kW				135	160	225	320	375
Water volume flow	m ³ /h	25,0	17						

1) Oil inlet=80°C / Oil outlet=50°C / water inlet= <30°C
2) 25 Oil inlet=80°C / Oil outlet=55°C / water inlet= 45°C

Ölkühler wassergekühlt / oil cooler water cooled



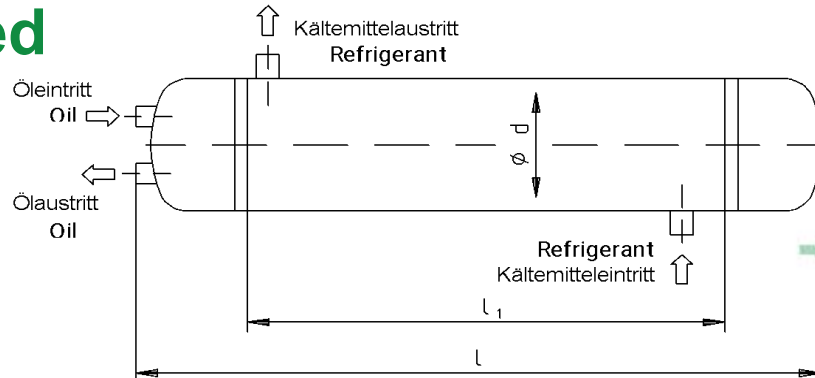
Korrosives Wasser -
Rippenrohre
Corrosive water – finned tubes

Typ / Type		H / 1400	H / 2300	L / 2300	J / 1400	M / 2300
Austauschfläche / Exchange area	m ²	3,8	6,4	10,7	13,9	23,4
Ölkühlleistung / Oil cooling capacity NH ₃ (2)	kW	60	70	105	180	250
Ölkühlleistung / Oil cooling capacity NH ₃ (1)	kW	35	60	100	140	240
max. zul. Wasserdurchsatz / max. water flow	m ³ /h	6,0	6,0	10,0	20,0	20,0
Durchmesser / Diameter	mm	125	125	150	200	200
Gesamtlänge / Length	mm	1525	2425	2413	1542	2442
Rohrbündellänge / Tube length	mm	1400	2300	2300	1400	2300
Öl Ein- und Austritt / Size oil in- and outlet	DN	40	40	40	50	50
Wasser Ein- und Austritt / Size water in- and outlet	DN	32	32	32	50	50
Masse / Weight	kg	61	80	108	143	210

Auslegungsdaten / Data for capacity calculation

Wasser-Eintritt / Water inlet temperature < 30°C

Ölkühler kältemittelgekühlt / oil cooler refrigerant cooled



Glattrohr mit Turbulenzstreifen /
Plain tubes with turbulence
stripes

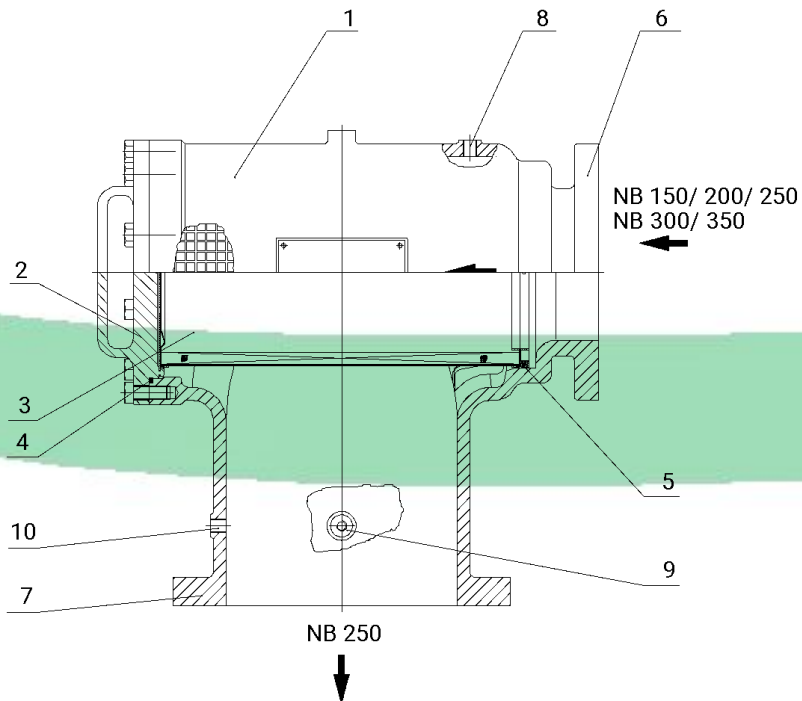
Typ / Type		150-1000	200-1500	200-2000	250-2000	300-1500	350-1500	350-2000	400-2000	450-2000	500-2000	550-2000	550-2500
Fläche / Exchange area	m ²	1,1	3,9	5,2	9,9	11,3	14,8	19,7	25,3	34	44,6	54,7	68,4
Ölkühlleistung / Oil cooling capacity 2)	kW	10	35	70	115	160	215	270	350	500	600	750	-
Ölkühlleistung / Oil cooling capacity 1)	kW	-	10	35	70	80	100	115	215	300	400	500	650
Durchmesser / Diameter	d mm	150	200	200	250	300	350	350	400	450	500	550	550
Länge / Total length	l mm	1200	1700	2200	2200	1700	1700	2200	2200	2200	2350	2362	2862
Rohrlänge / Tube length	l ₁ mm	1000	1500	2000	2000	1500	1500	2000	2000	2000	2000	2000	2500
NW Öl / Oil connection	DN	32	40	40	40	50	50	50	50	65	80	100	100
NW Kältemittel ein / Refrigerant inlet	DN	32	40	50	50	65	65	65	80	100	100	100	100
NW Kältemittel aus / Refrigerant outlet	DN	40	50	65	65	65	80	80	100	125	125	150	150
Charge refrigerant	l	13	34	45	67	67	80	106	132	167	205	235	295
Charge oil	l	4	13	18	32	38	50	64	86	103	152	170	220

Technical specifications / Technische Spezifikation:

2) Condensing temperature/ max. +40°C oil inlet / Öleintritt 90°C oil outlet / Ölaustritt 60°C

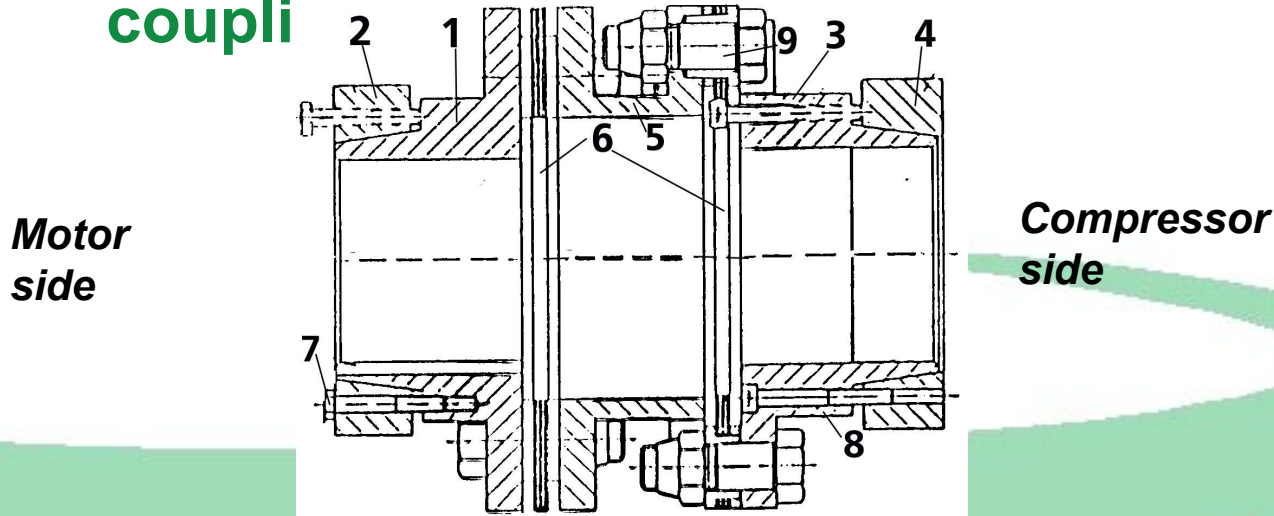
1) Condensing temperature/ max. +40°C oil inlet / Öleintritt 80°C oil outlet / Ölaustritt 50°C

Saugfilter / Suction filter



Item	Designation	Bezeichnung
1	Housing	Gehäuse
2	Cover	Deckel
3	Filter element	Filter
4	O ring	Rundring
5	O ring (for position 3)	Rundring (für Pos. 3)
6	Refrigerant inlet	Kältemiteleintritt
7	Refrigerant outlet	Kältemittelaustritt
8	Venting port	Entlüftung
9	Port for PT100/ PT1000	Anschluß PT100/PT1000
10	Port for pressure measuring	Drucksensoranschluß

**Kupplung / Steel lamination
coupli**



Pos. – Nr. / Pos.-No.	Description	Bezeichnung
1	Motorseitige Nabe	Drive side hub
2	Motorseitiger Spannring	Drive side damping ring
3	Verdichterseitige Nabe	Compressor side hub
4	Verdichterseitiger Spannring	Compressor side damping ring
5	Zwischenstück	Spacer
6	Lammellenpakete	Disc packs
7	Spannsatzschrauben (Motorseite)	Tapered bush screws (drive side)
8	Spannsatzschrauben (Verdichterseite)	Tapered bush screws (Motor side)
9	Paßschraube	Fit bolts

**Kupplung /
 Steel lamination
 coupling**

**Anzugsmoment für
 Spannverbände:**

**Tightening torques for
 tensioning set:**

**Anzugsmoment für
 Lamellenpakete:**

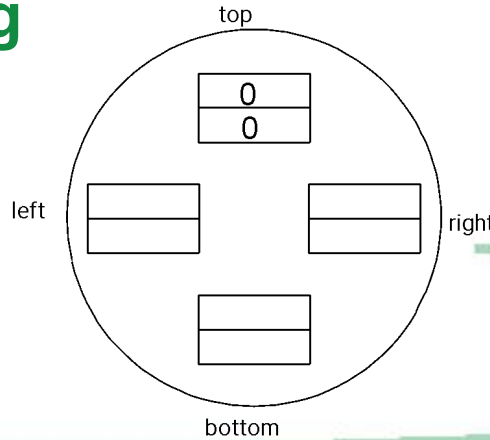
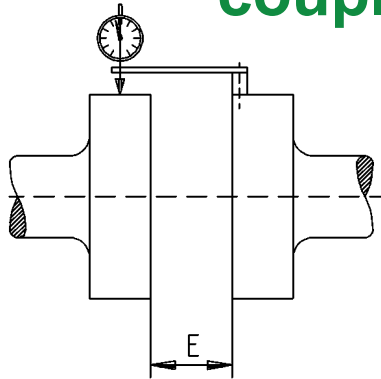
**Tightening torques for
 lamination package:**

Anzugsmomente für Spannsatzschrauben / Tightening torque for tapered bush screws						
Kupplungsgröße Coupling Size	Verdichterseite / Compressor side			Motorseite / Drive side		
	Wellendurchmesser Shaft diameter	Gewinde Screw Size	Tan [Nm]	Wellendurchmesser Shaft diameter	Gewinde Screw Size	Tan [Nm]
66 E60	40	M8	30	55	M6	12
	50	M6	14	65	M8	20
105 E70	50	M10	59	55	M8	30
	60	M8	20	60	M6	12
				65	M6	12
70	M8	30				
168 E70	60	M8	25	75	M6	14
260 E80	60	M8	30	65	M6	12
				70	M8	30
	80	M8	30	75	M6	14
330 E105	80	M12	59	80	M10	59
				85	M8	30
				90	M8	30
				95	M6	12
100	M6	12				
330 E120						
520 E120						
660 E120						

Anzugsmomente für Paßschrauben / Tightening torque for fitbolts				
Kupplungsgröße Coupling Size	Paßschraubengröße Fitbolts size	Tan [Nm]	Tan [Nm] NEW values*	Ausbaumaß [mm] Coupling distance [mm]
66	M 10x35	67	66	60/70 + 0,20
105	M 12x40	115	115	70 + 0,20
168	M 16x46	290	250	70 + 0,20
260	M 16x48	290	250	80 + 0,25
330	M 20x65	560	490	105/120 + 0,25
520	M 20x65		490	120
660	M 24x70		840	120

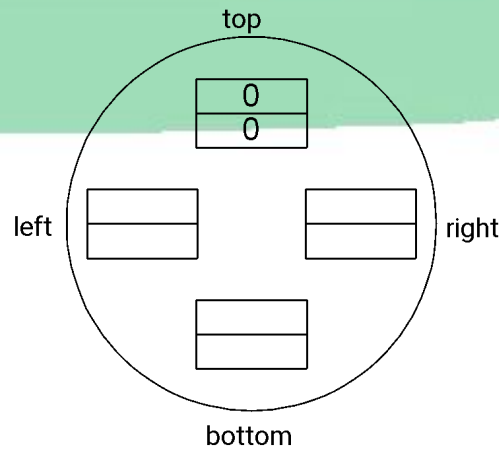
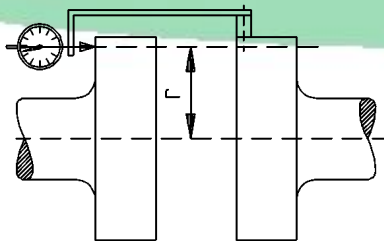
*NEW values: since
 04/2003

Kupplung / Steel lamination coupling



Radial misalignment

Versatz

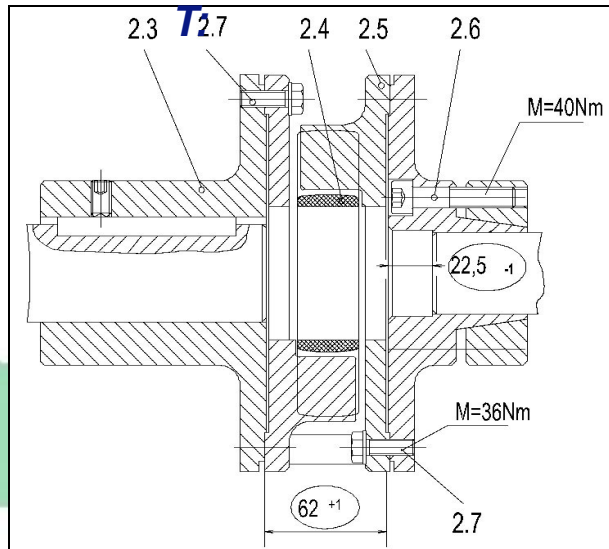


Angular misalignment

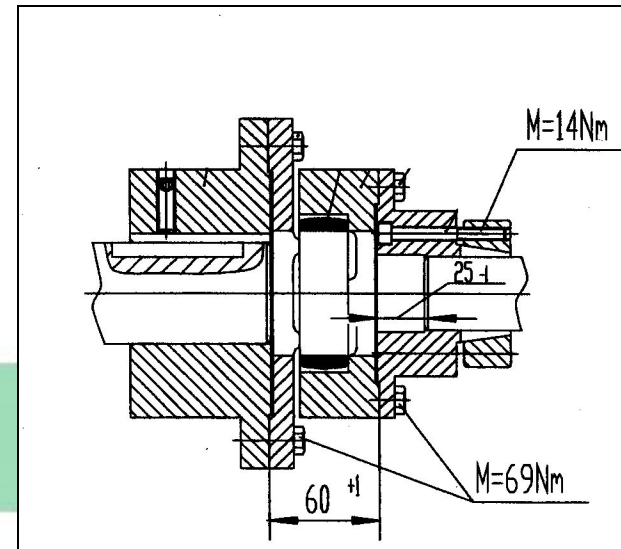
Klaffung

Kupplung / coupling SMALL

design



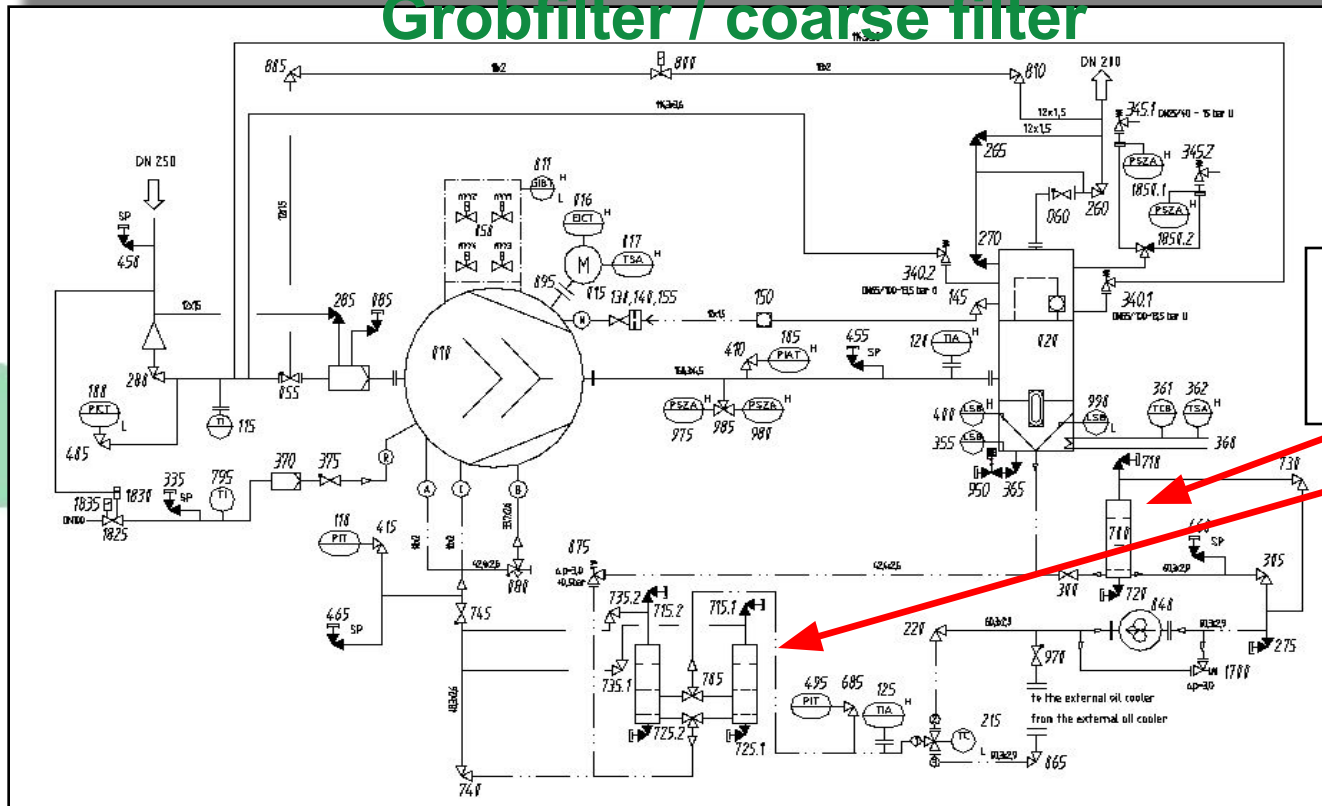
design



Abbau des Kupplungsschutzes (2.2) am Kupplungsgehäuse. Ölrohr (5.4) aus dem Deckel der Gleitringdichtung herausdrehen. Sechskantschrauben (2.7) aus motor- und verdichterseitiger Kupplungsnabe herauserschrauben. Kupplungsmittelteil (2.5) zusammendrücken, so daß die Zentrieransätze aus den Naben rutschen. Kupplungsmittelteil mit dazwischenliegendem elastischen Zwischenring (2.4) herausnehmen. Zylinderschrauben (2.6) des Spannverbandes der verdichterseitigen Kupplungsnabe lösen und Nabe von der Verdichterwelle ziehen.

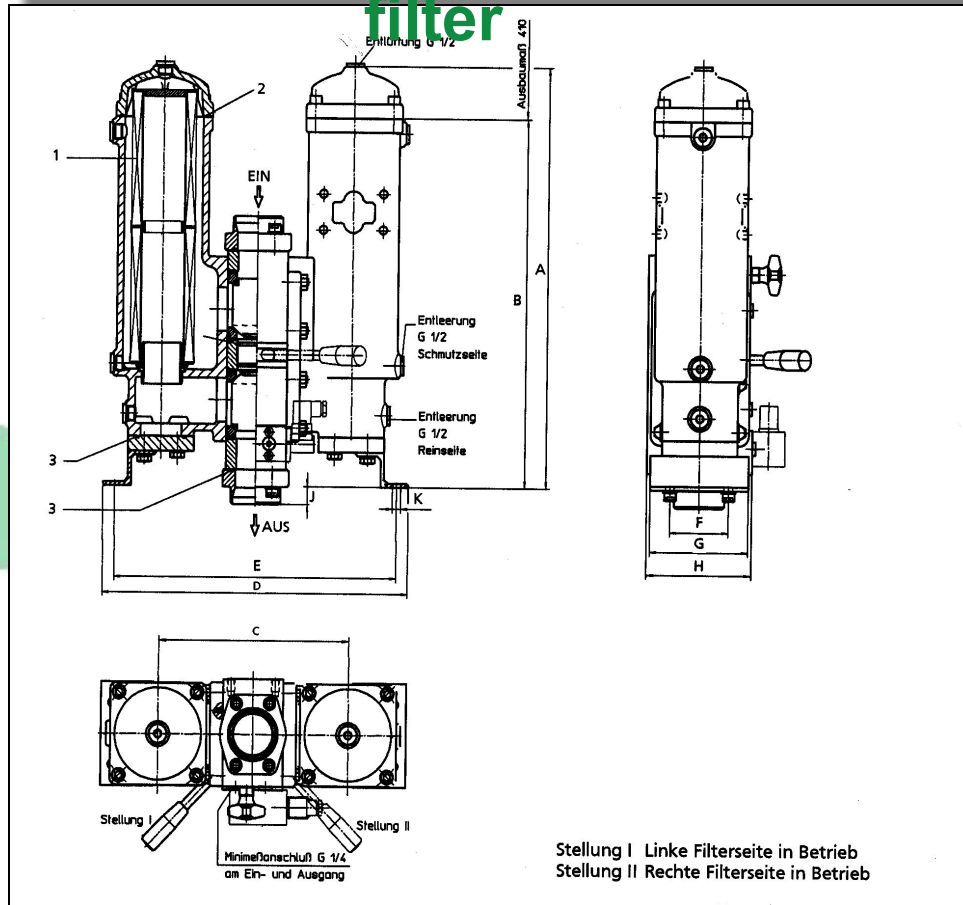
Remove the coupling guard (2.2) on the coupling housing. Twist out the oil pipe (5.4) from the cover of the mechanical contact seal. Unscrew the hex. screws (2.7) from the coupling hub on motor and compressor side. Press the central part of the coupling (2.5) so that the centering shoulders slide out of the hubs. Remove the central part of the coupling together with the elastic spacer ring (2.4) located in between. Unscrew the cheese-headed screws (2.6) of the clamping joint of the coupling hub on the compressor side and pull off the hub from the compressor shaft.

Doppelölfilter / Double oil filter Grobfilter / coarse filter

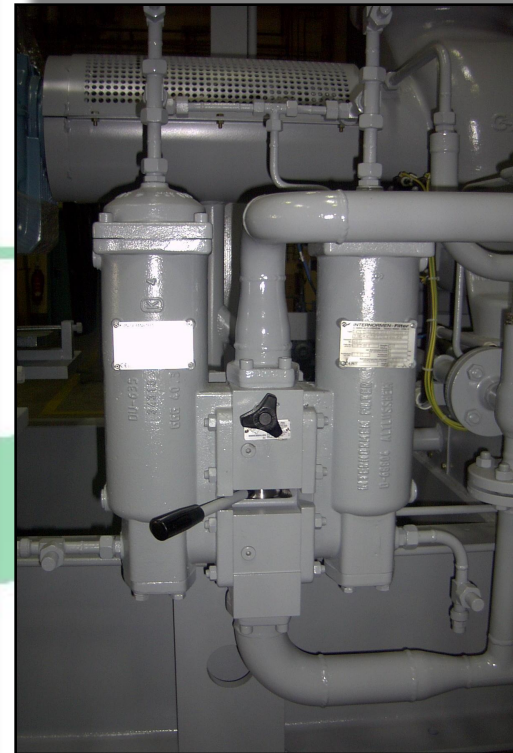


**for NEW refrigerants:
coarse filter (e.g. 40µm)
fine filter (e.g. 25µm)**

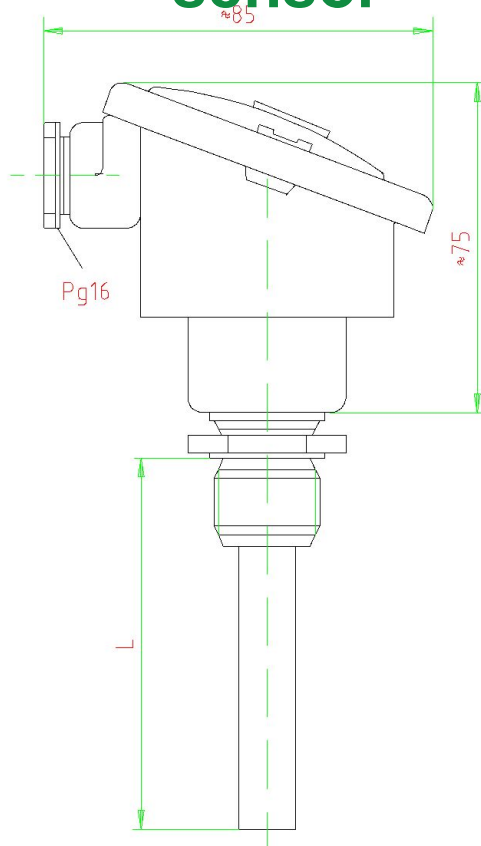
Doppelschaltfilter / double oil filter



Stellung I Linke Filterseite in Betrieb
Stellung II Rechte Filterseite in Betrieb

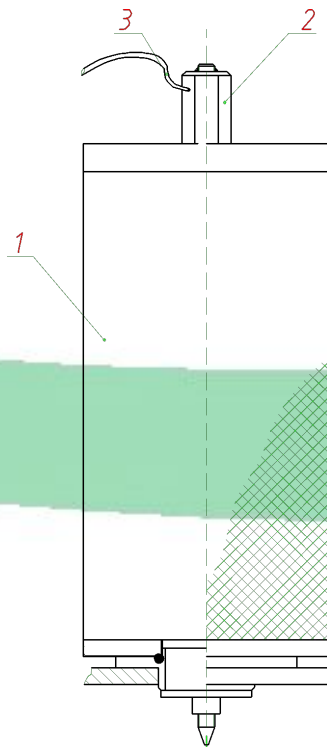


Temperatursensor / temperature sensor



Protection tube / Schutzrohr :	Durchmesser/diameter: 8 mm; Edelstahl / high grade steel;
Verschraubungslänge / Fitting length :	30 / 60 / 90 / 120 mm
Fühlerdurchmesser / Measuring compartment :	4 - 5 mm
Gewindeanschluß / Screw-in-thread :	M12x1,5
Schutzgrad / Degree of protection:	IP 54
Betriebsdruck (max.) Pressure range :	Max. 35 bar
Temperature range :	-50°C to 140°C

Feinabscheidepatrone / Fine filter cartridges



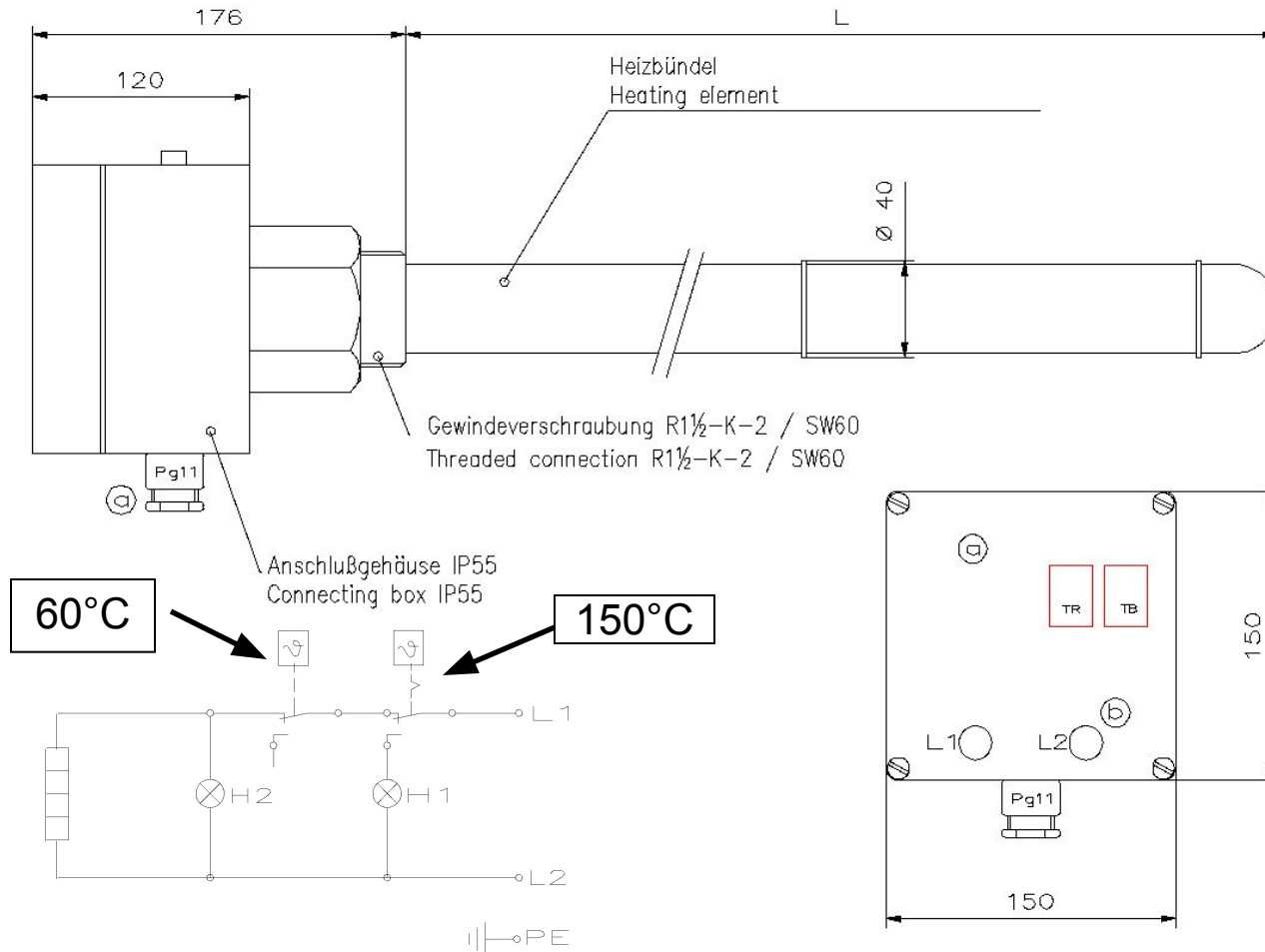
REPLACEMENT OF THE OIL SEPARATION CARTRIDGES

1. Close the discharge and suction side shut-off fittings.
2. Draw off refrigerant and depressurize the SCP.
3. Check the pressure on the display of the compressor control device or connect a test pressure gauge.
4. Remove the pipe bend from the oil separator.
5. Remove the non-return valve built in the oil separator. This step is omitted if a non-return valve is used the discharge side of which can be shut off.
6. Remove the locking wire [3].
7. Loosen the hexagon head screws [2] used to attach the oil fine separation cartridges.
8. Remove the cartridge [1].
9. Mount the new cartridge in the reverse sequence.

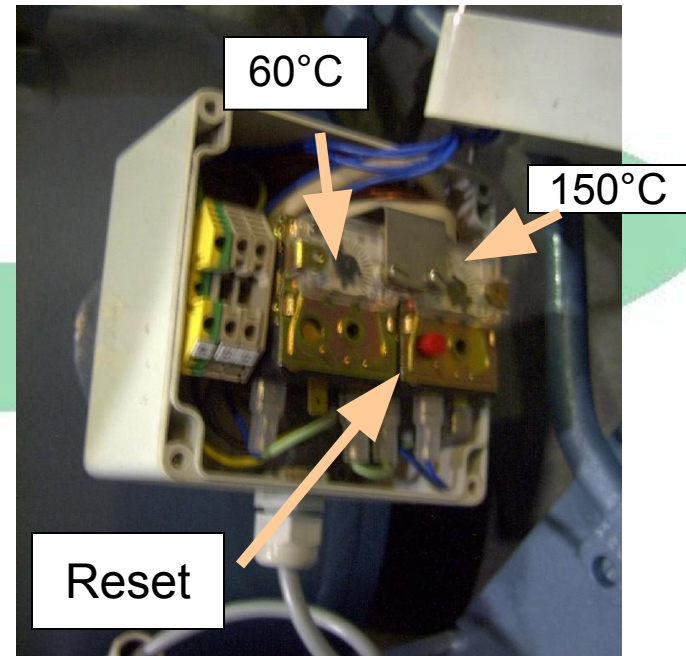
AUSTAUSCH DER FEINABSCHIEDPATRONEN

1. Schließen der Absperrventile auf der Saug- und Druckseite.
2. Entfernen des Kältemittels und Ablassen des Drucks.
3. Kontrolle des Aggregatdrucks.
4. Demontage des Rohrbogens am Austritt Ölabscheider.
5. Demontage des im Ölabscheider eingebauten Rückschlagventils. Bei externem Rückschlagventil ist dies nicht notwendig.
6. Entfernen des Sicherungsbandes [3].
7. Lösen der Muttern auf der Oberseite der Patrone [2].
8. Ausbau der Feinabscheidepatronen.
9. Montage in der entgegengesetzten Reihenfolge.

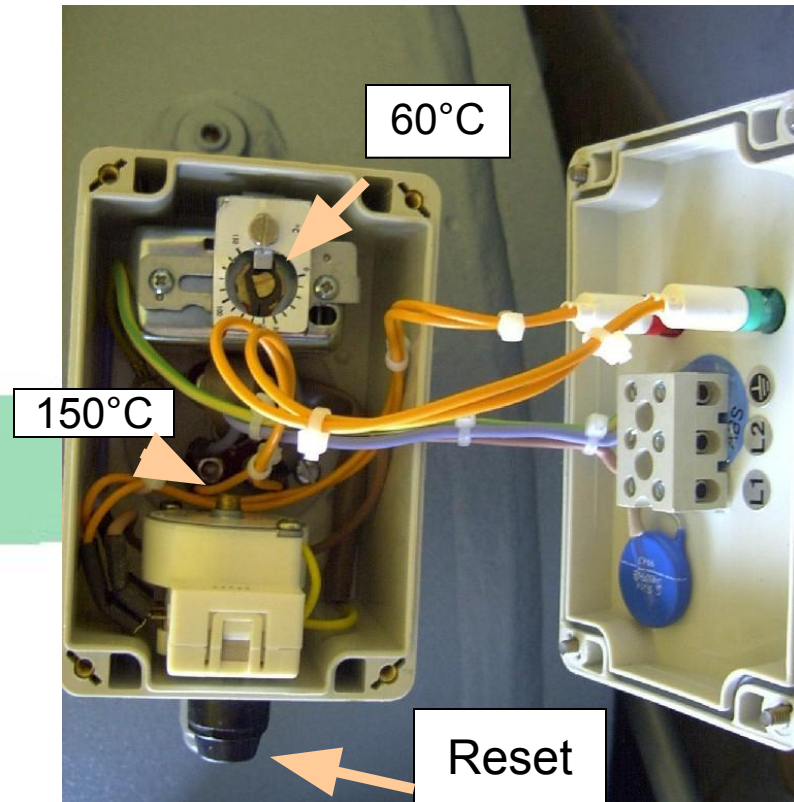
Ölheizung / oil heater



Ölheizung / oil heater



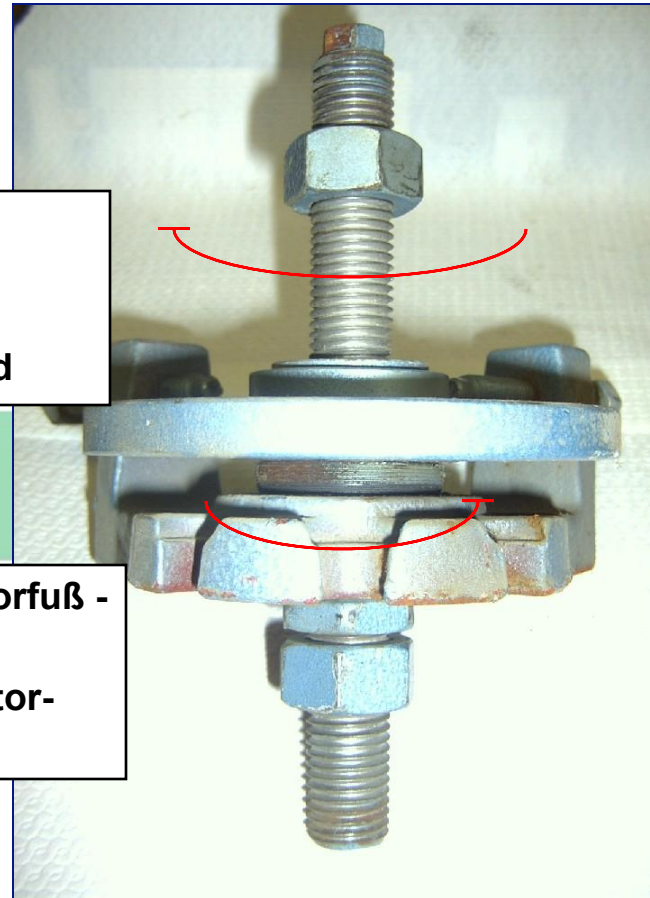
Ölheizung / oil heater - HELIOS



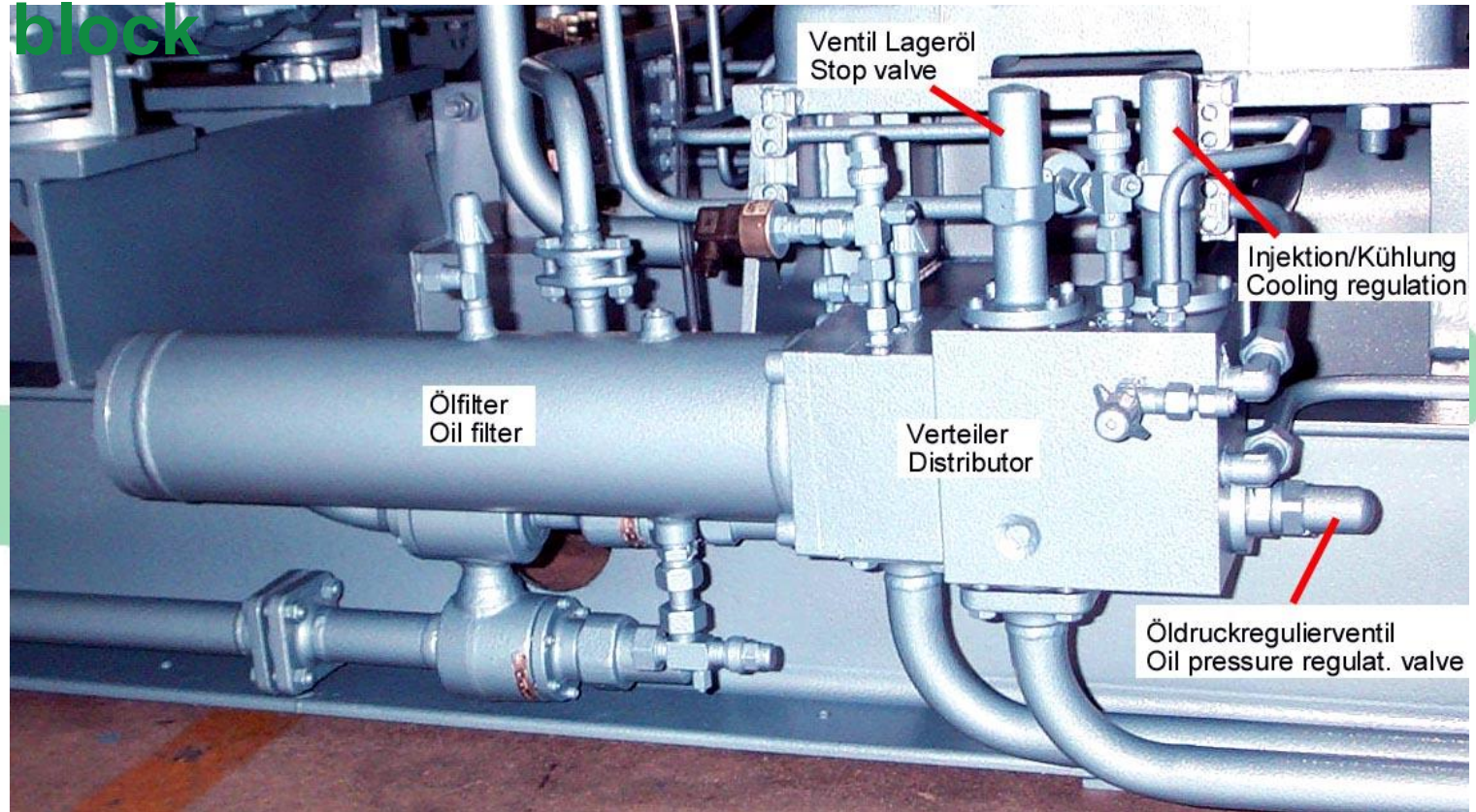
Motorfixatoren - Fixator

Fixierung Motorfuß -
Linksgewinde
Fixation motor-
Anti-clockwise threaded

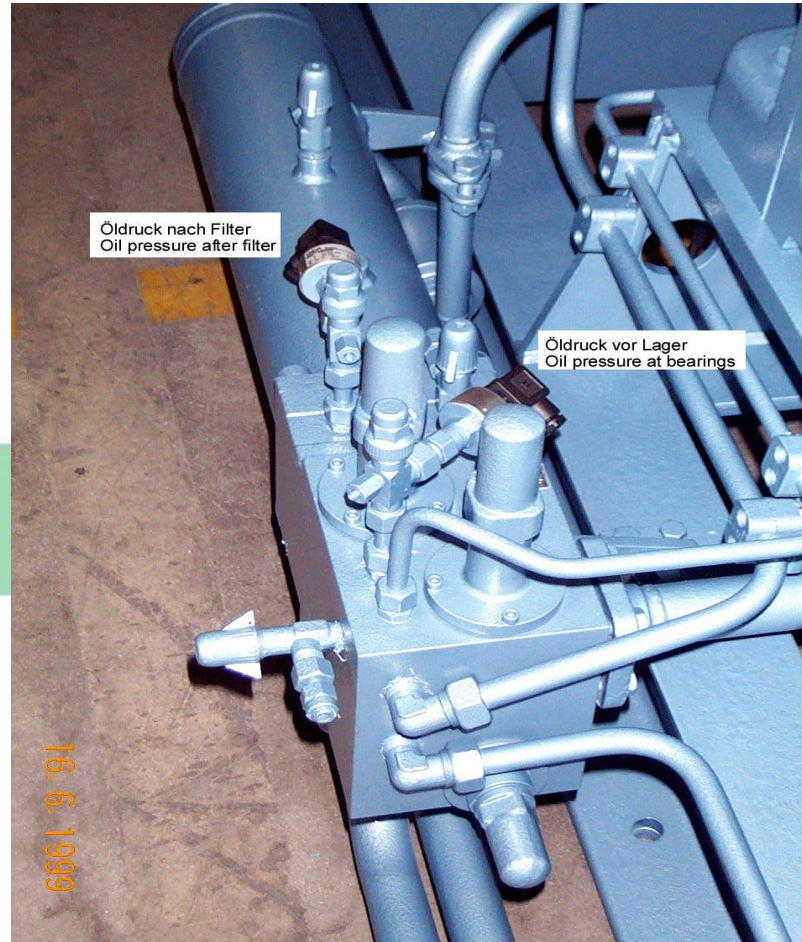
Höheneinstellung Motorfuß -
Rechtsgewinde
Height adjustment motor-
clockwise threaded



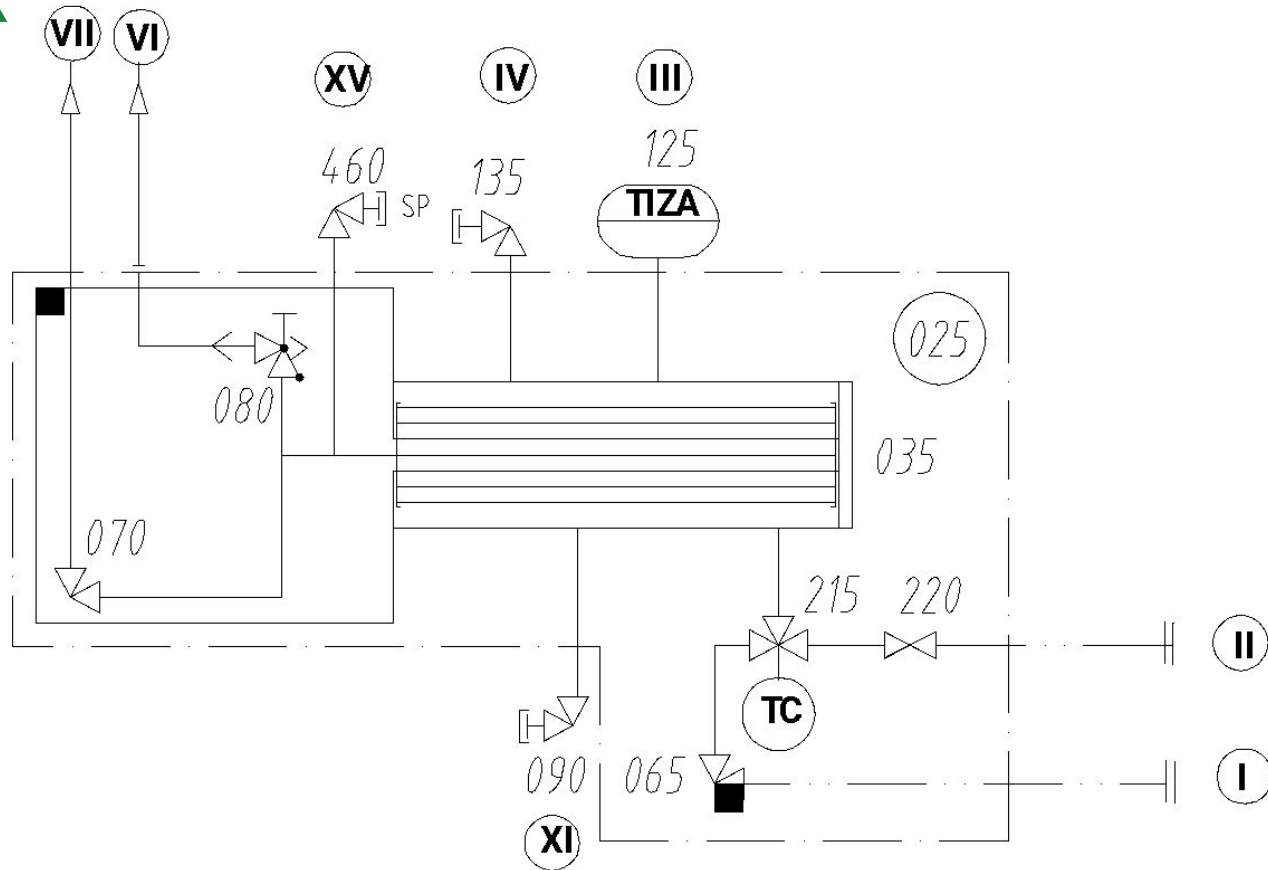
Ölmanagementblock/Multifunctional block



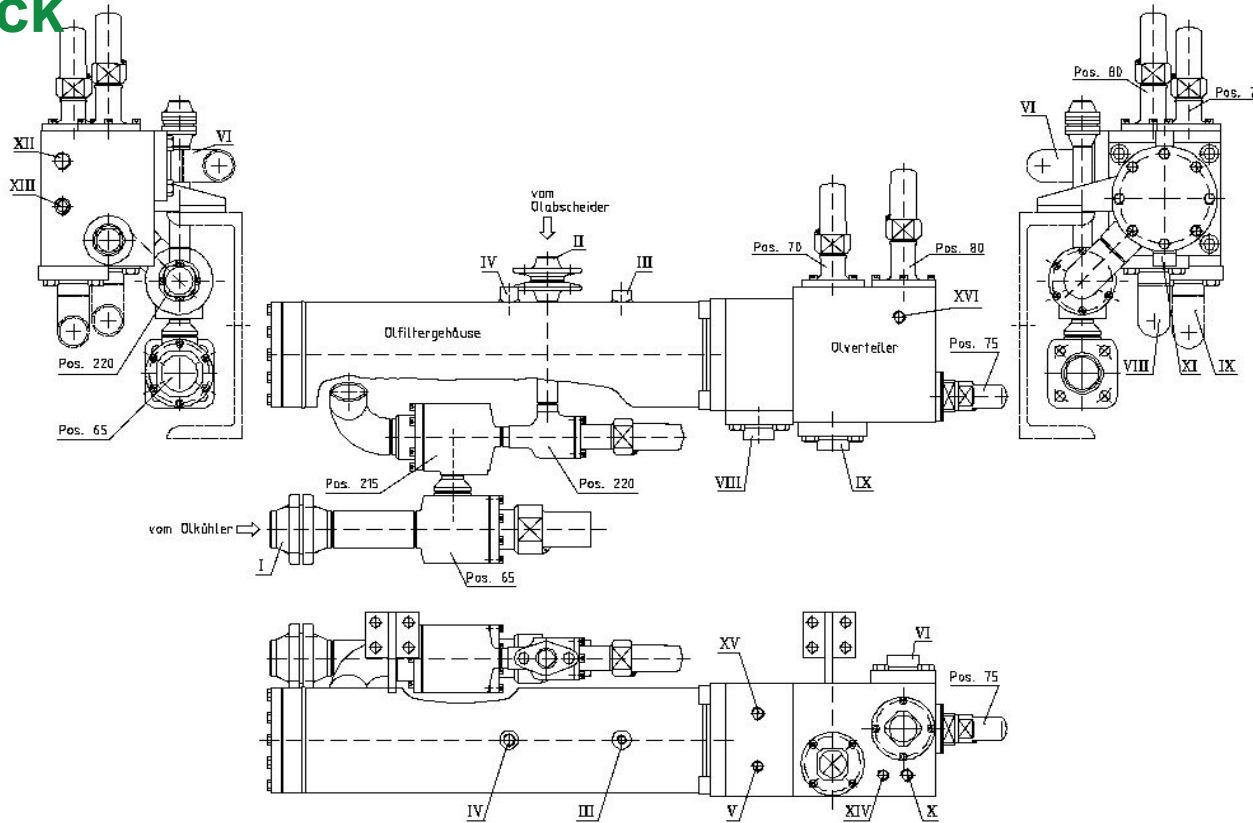
Ölmanagementblock/Multifunctional block



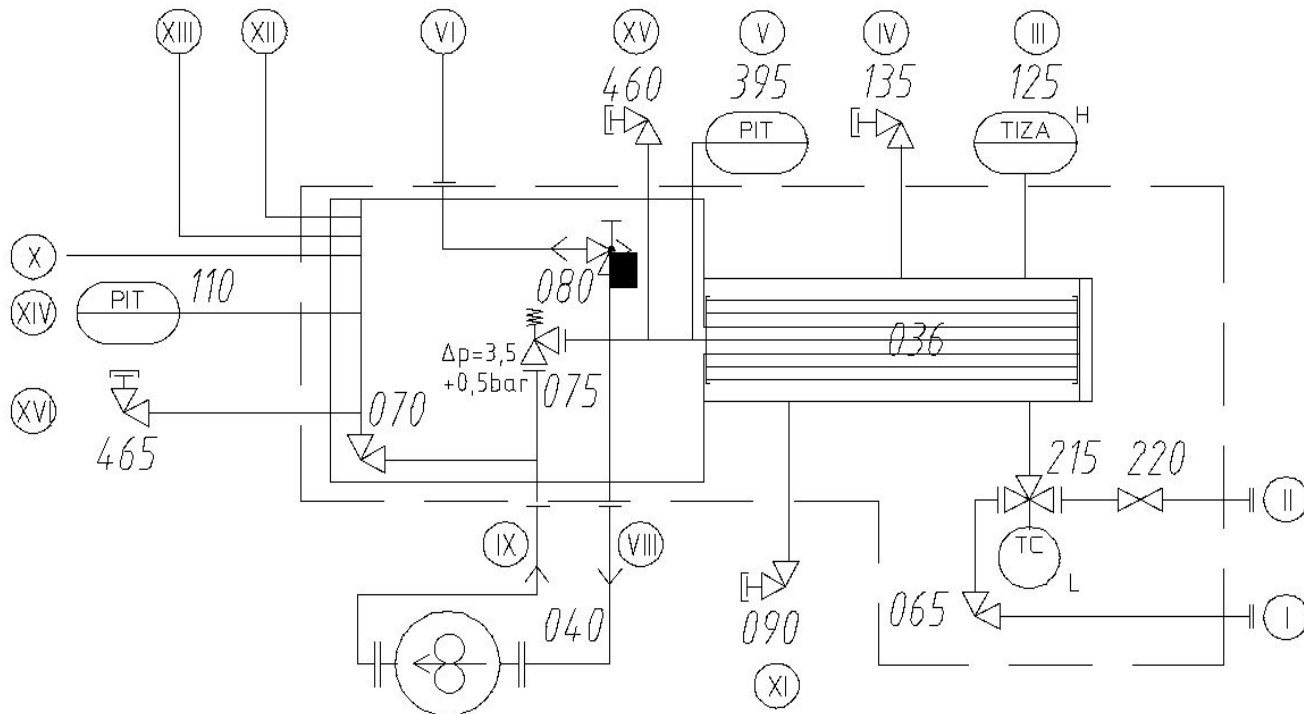
MEDIUM - Ölmanagementblock/Multifunctional block



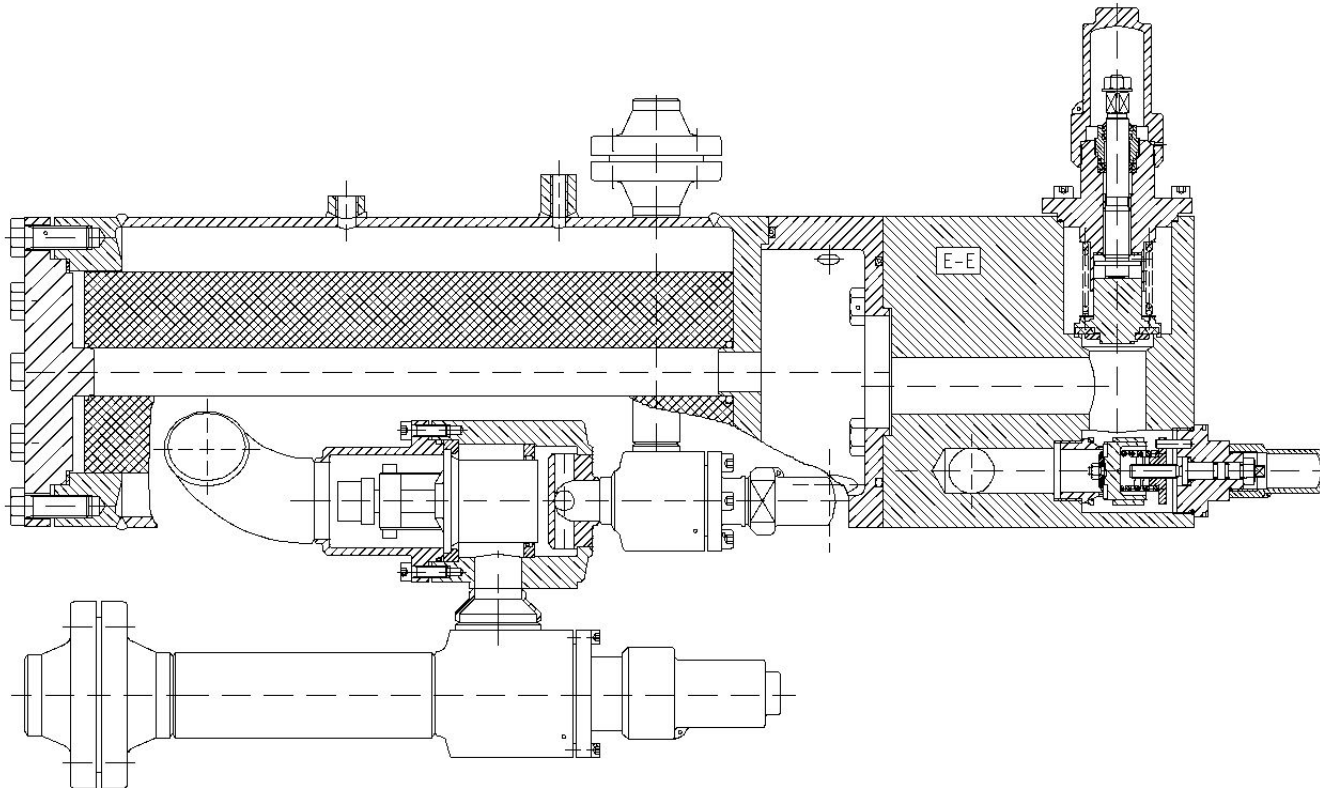
LARGE - Ölmanagementblock/Multifunctional block



LARGE - Ölmanagementblock/Multifunctional block

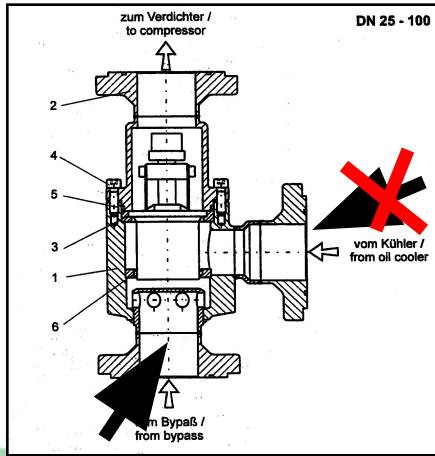


LARGE - Ölmanagementblock/Multifunctional block

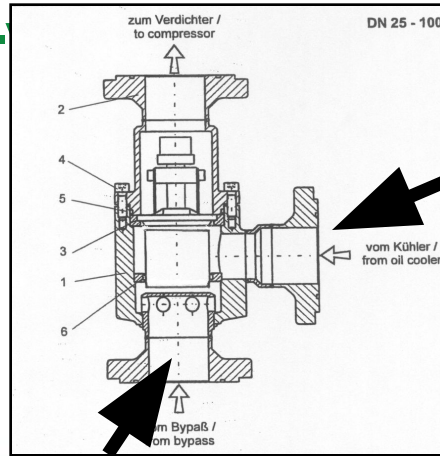


3-Wege-Ventil /

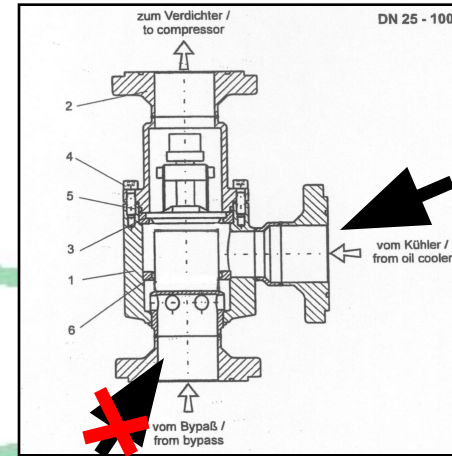
ay-



*start
condition
cold oil*

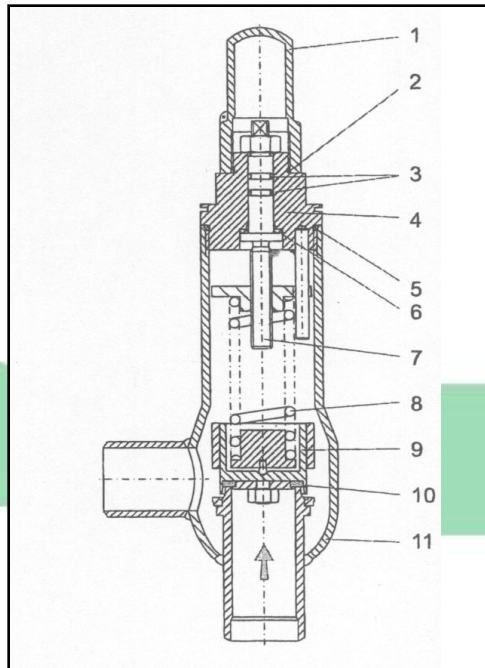


*operation condition
correct oil
temperature*



*Increased
oil
temperature*

Öldruckregulierventil / oil pressure regulating valve



**POS 5: O-Ring
50x3**



**Valve piston
(Old design)**



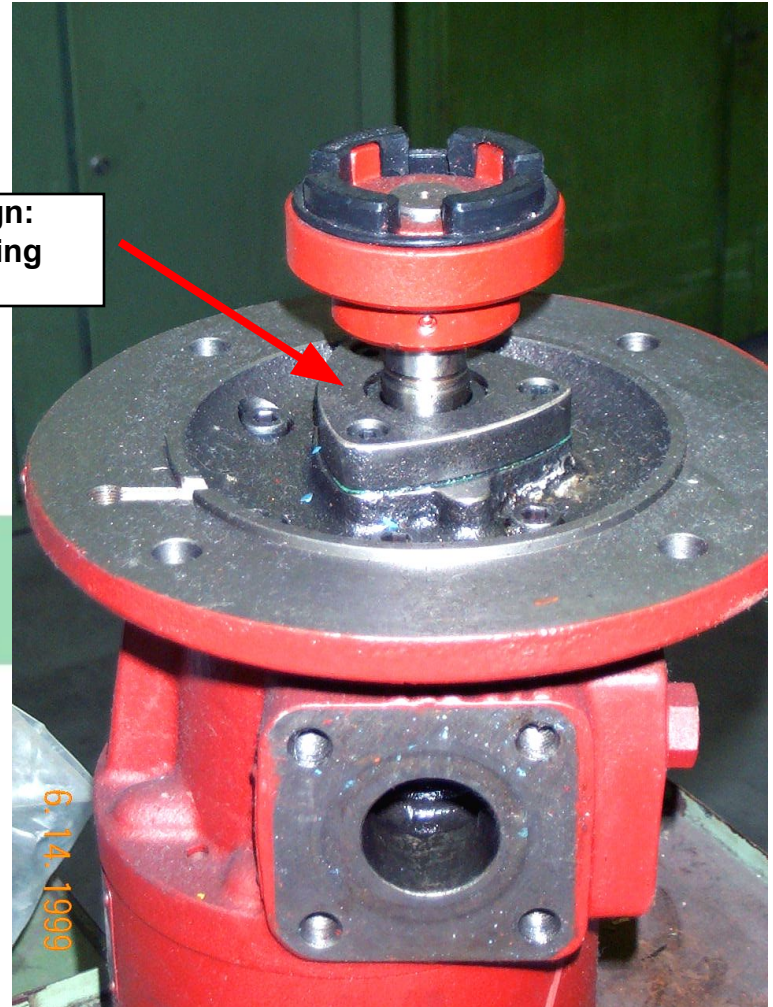
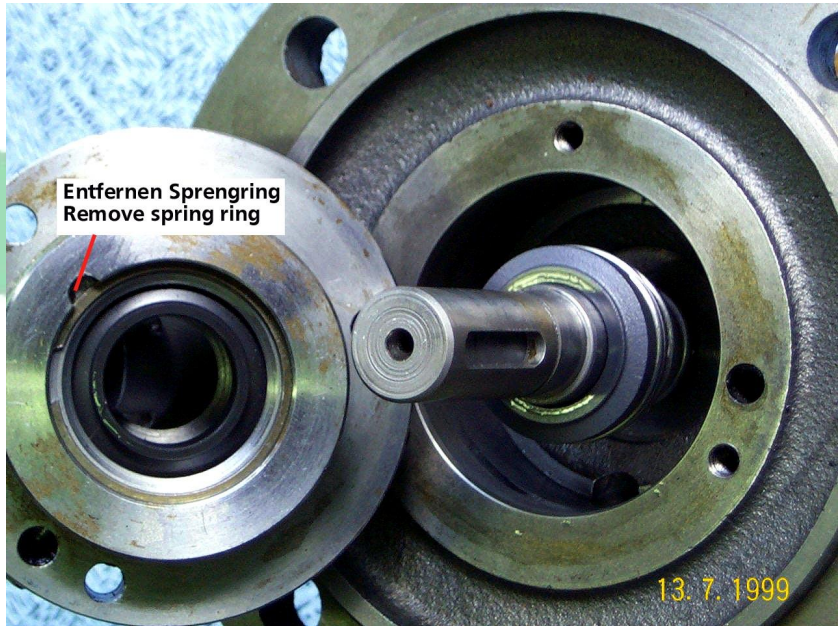
**Valve piston
(NEW design)
Since
~10/2002**



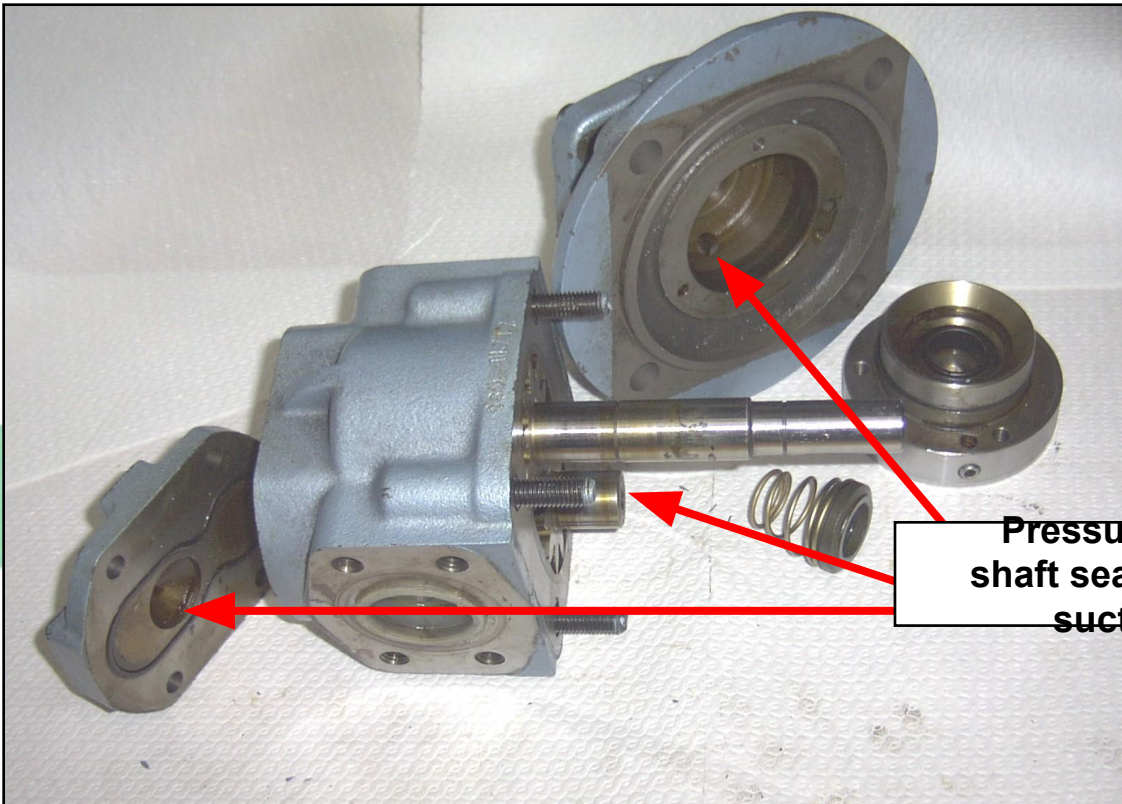
**Valve piston
seat**

Ölpumpe / oil pump

**NEW design:
hole for lifting
screw**



Ölpumpe / oil

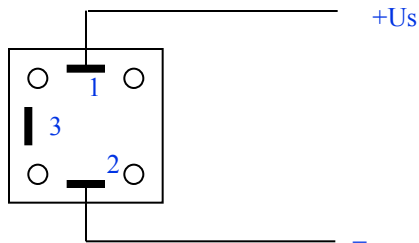


**Pressure balance:
shaft seal chamber to
suction side**

**Operation range:
Suction pressure: < 16bara
Discharge pressure: <
25bara**

Drucksensor / Pressure sensor

Versorgungsspannung:	10 – 30 V Gleichstrom
Voltage:	10 –30 V DC
Standardsignal:	4 – 20 mA
Signal:	
Betriebsdruck:	35 bar
Max. pressure:	35 bar
Schutzgrad:	IP 65
Prot. Level:	
Gewinde	G ¼"
Screw thread:	



Standard pressure range:

- 0-21bara (since 05/2003: 0-25 bara)
- 0-7bara (for suction pressure)



Anschlussbelegung
 Connecting terminal