Grasso GmbH Berlin
Service Department

Schulung / Training
PART II

Schraubenverdichteraggregate & Komponenten
screw compressors packages & components

Bezeichnung / Designation code

Bezeichnung / Designation code X Y - 9 A (X1)

Typ Verdichter / Compressor type

Ausführung Aggregat / Design compressor package

Ausführung Verdichter / Design compressor

Ölabscheidung, -kühlung / Oil separation, oil cooling

Baugröße (2-stufig) HD/ Compressor type 2-stage HP

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**		

Package designation code

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	**Freqwuenzgesteurert,Type G, N**	**Frequency controlled, TypeG, N**	**Stufenlos/Continuously.**

A ÖLABSCHEIDUNG, ÖLKÜHLUNG / OIL SEPARATION - OIL COOLING

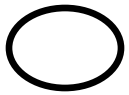
code letter	Mit Feinölabscheidung With oil fine separation	code letter	Ohne Feinölabscheidung Without oil fine separation
A	Wassergekühlte Ölkühler, Water cooled oil cooler	G	Wassergekühlte Ölkühler, Water cooled oil cooler
B	Kältemittelgekühlte Ölkühler, Refrigerant cooled oil cooler	H	Kältemittelgekühlte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

	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

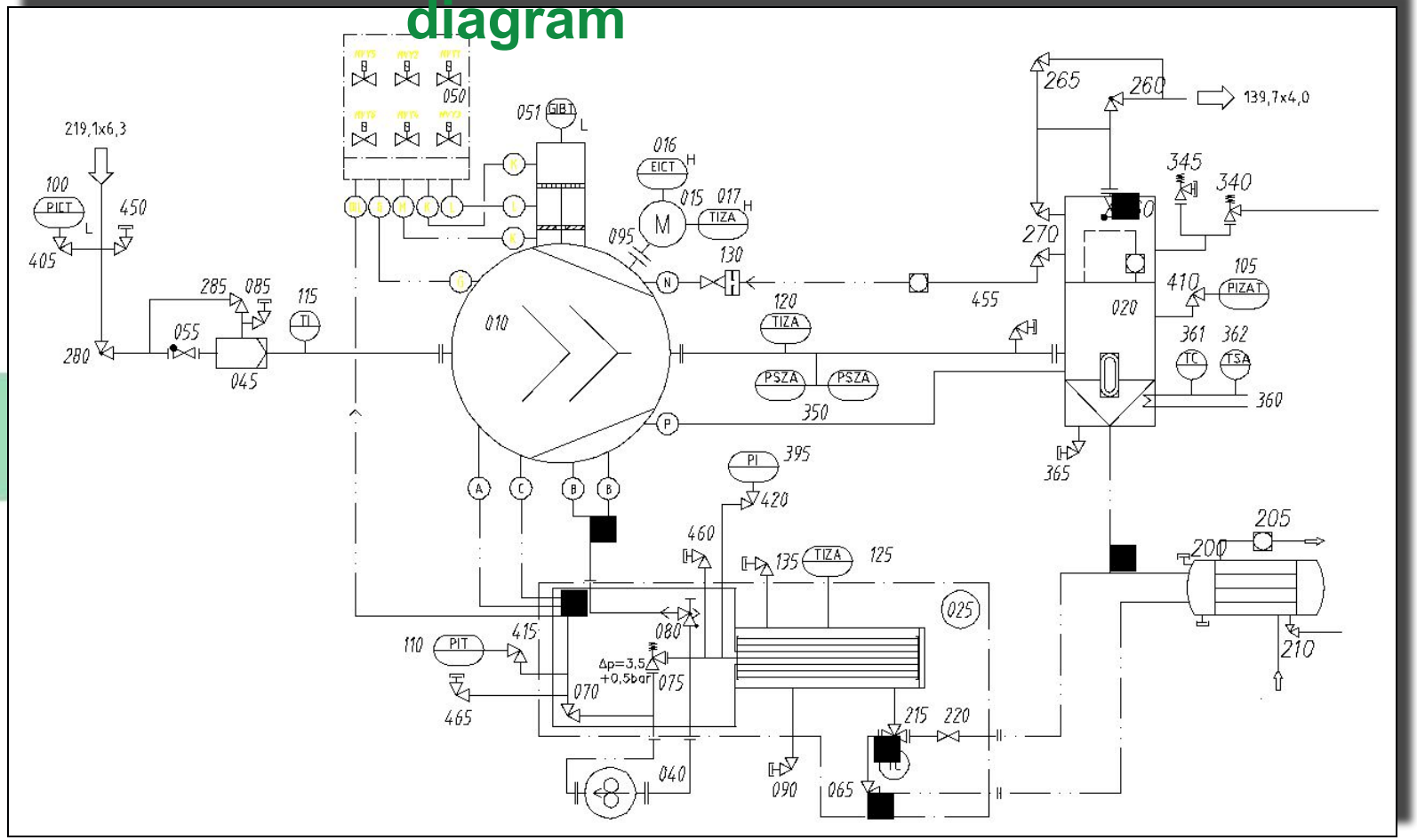


Bedienung und Anzeige am Gerät
Non-remote display control

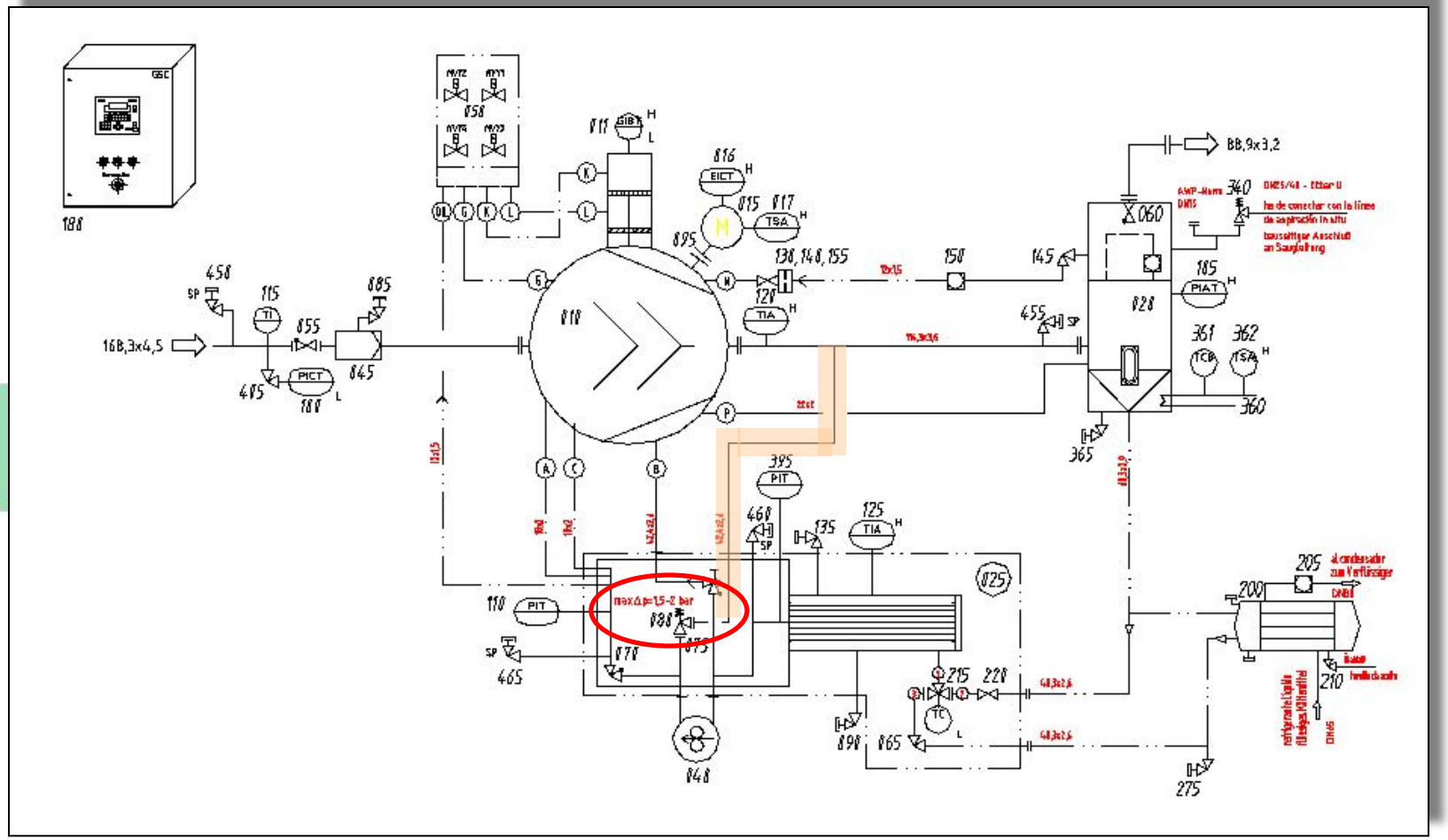
Fernanzeigend
Remote display & control

LARGE – Piping diagram old

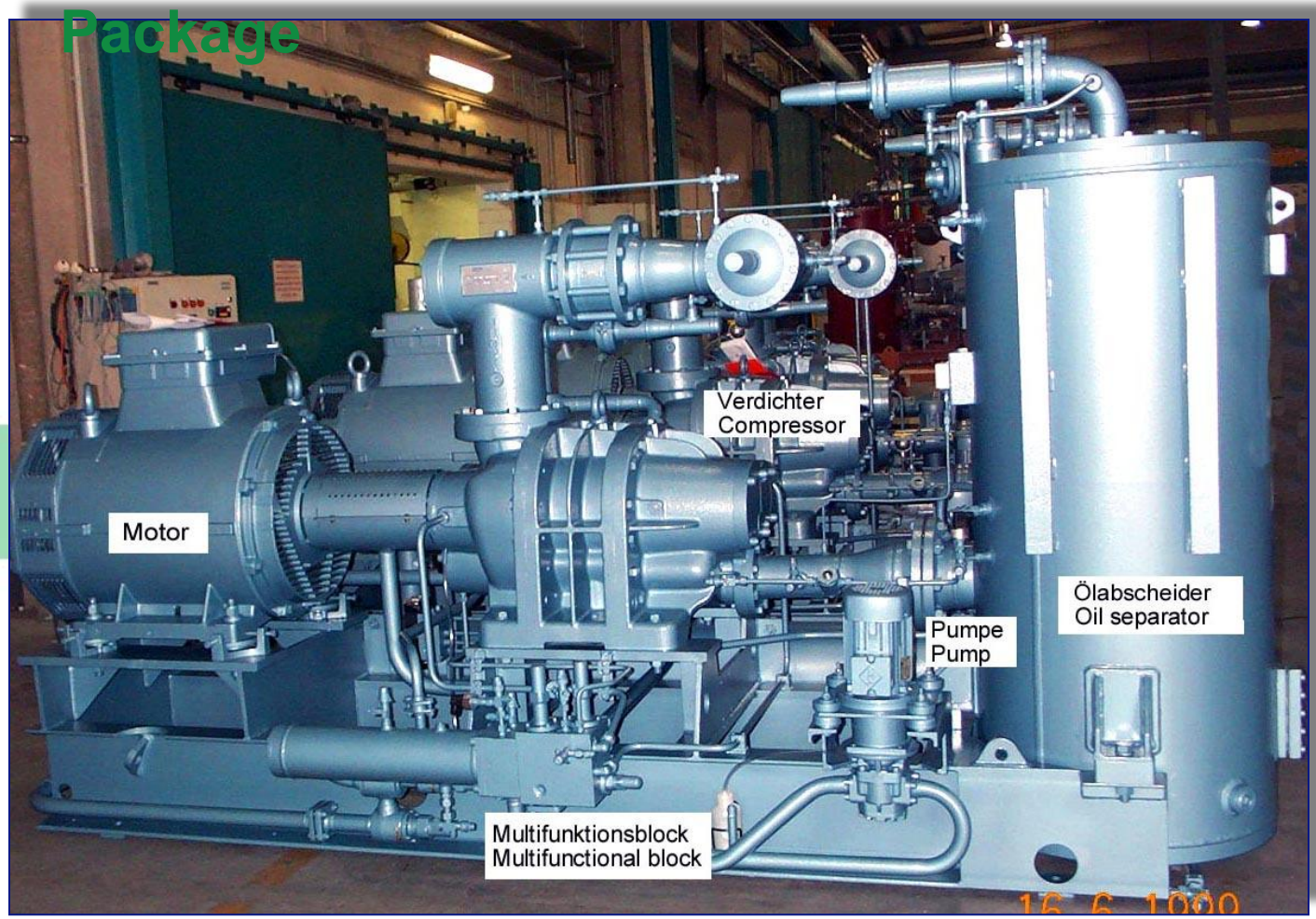
R+I Schema / P+I diagram



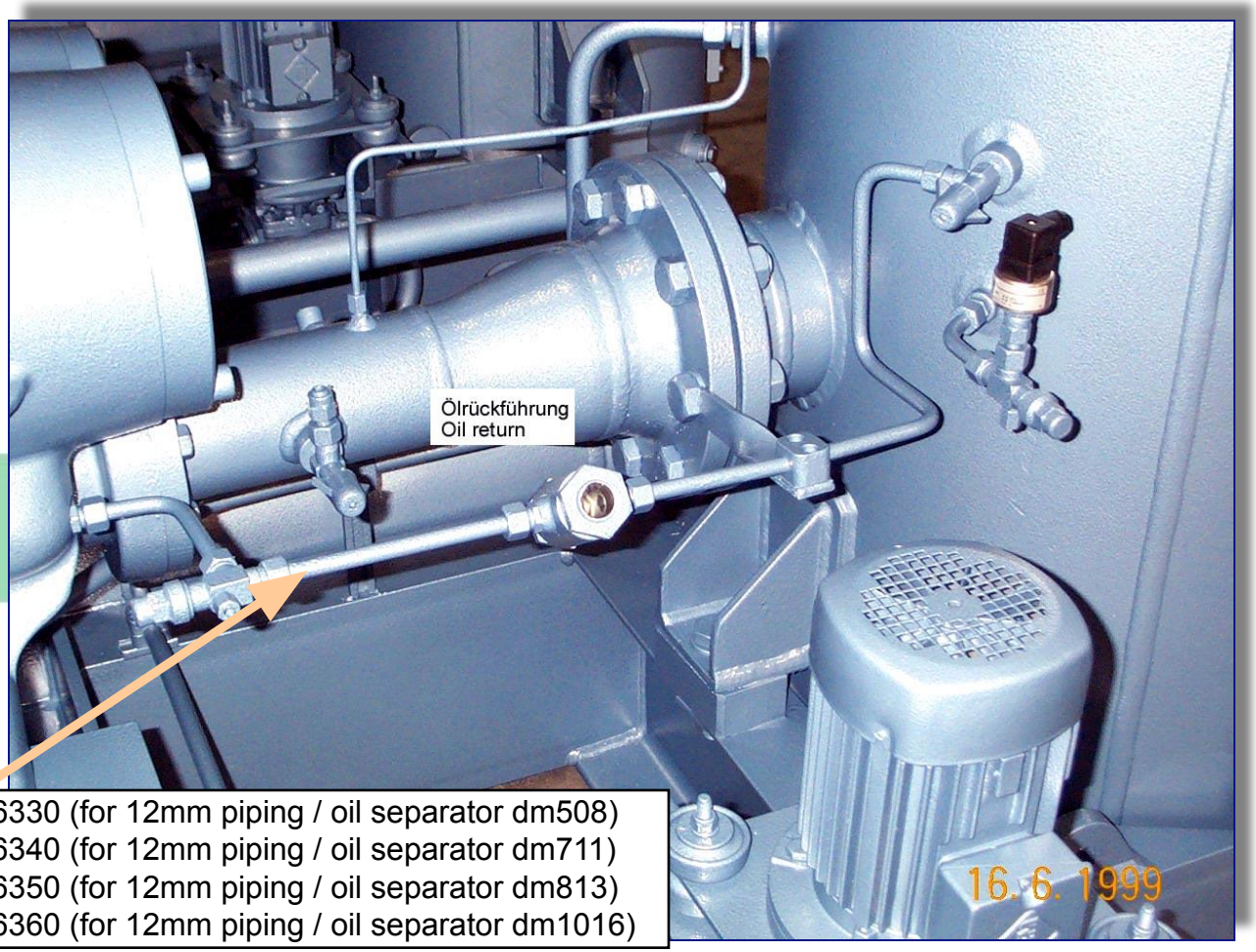
R+I Schema (neu) / P+I diagram



LARGE Verdichteraggregat / LARGE Package



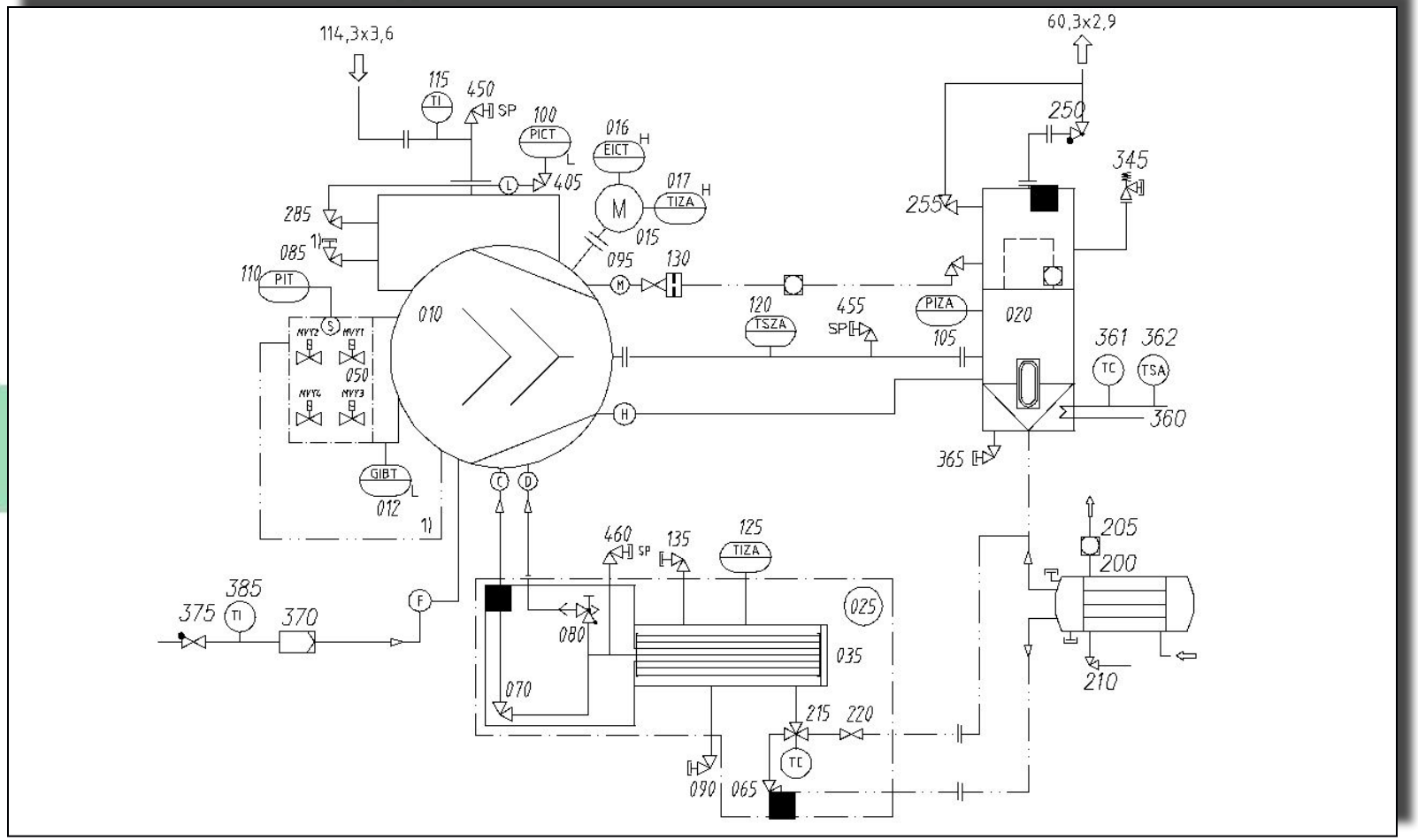
LARGE Ölrückführung / LARGE oil return



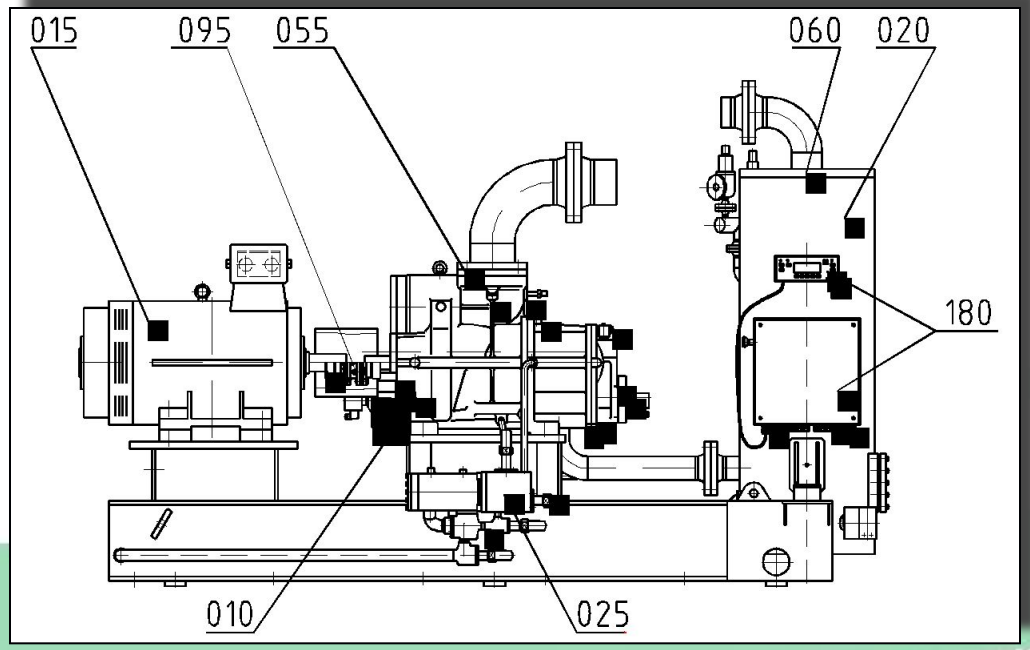
Filter, ID: 0726370

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

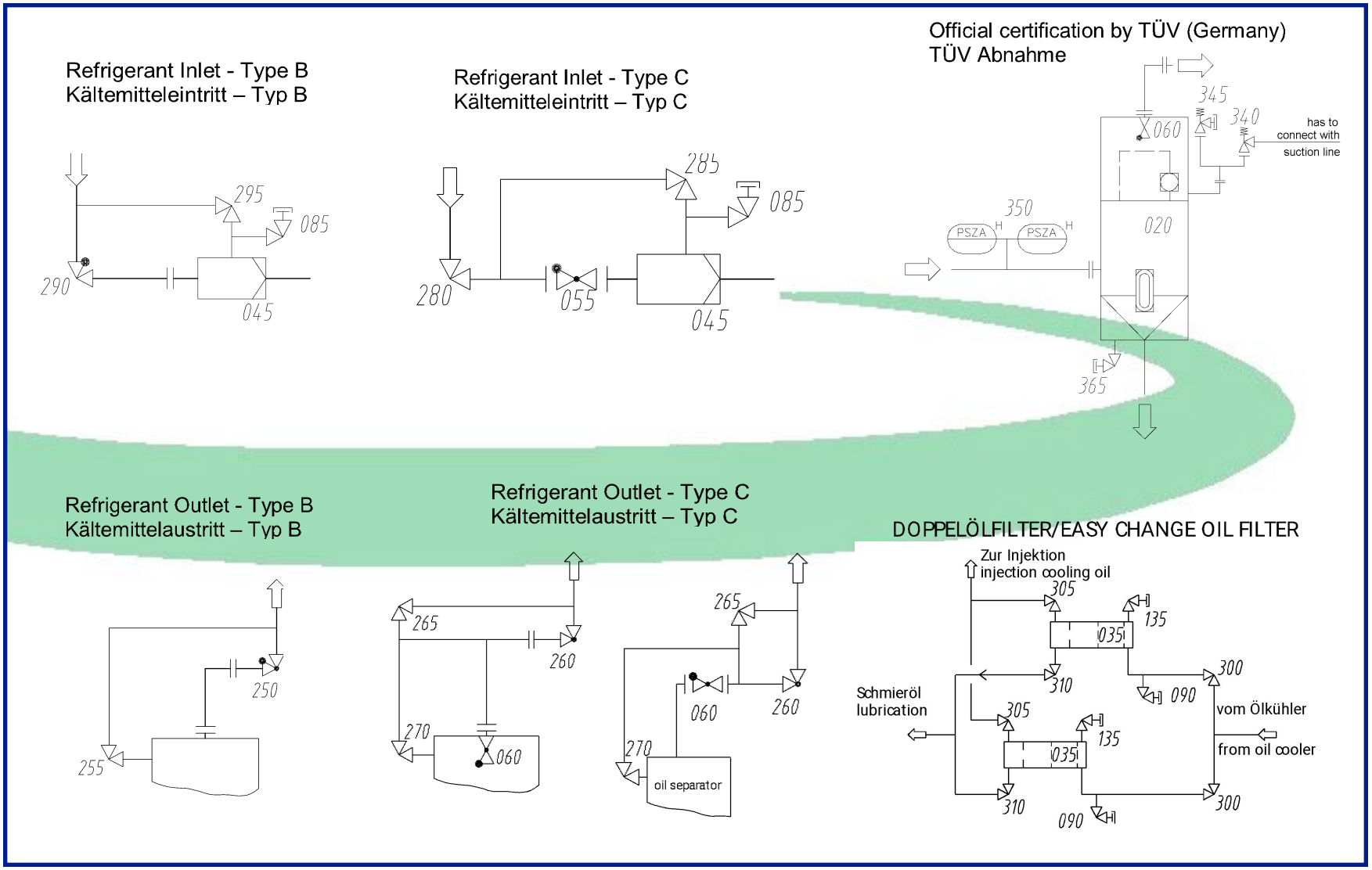

114,3x3,6
60,3x2,9
115
TI
450
SP
100
PICT
L
405
016
EICT
H
017
TIZA
M
015
285
085
1)
110
PIT
095
130
010
120
TSZA
455
SP
PIZA
105
020
250
345
255
361
362
TC
TSA
360
365
050
GIBT
012
460
SP
135
125
TIZA
205
200
385
375
TI
370
F
080
025
035
070
210
215
220
TC
090
065

MEDIUM – components of Package



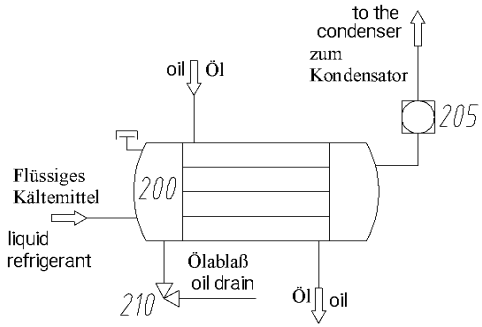
010	Verdichter / screw compressor	055	Rückschlagventil (integriert) / check valve - suction side (integrated)
015	Motor / compressor drive motor	060	Rückschlagventil / check valve - discharge side
020	Ölabscheider / oil separator	095	Kupplung / coupling
025	Filter mit Multifunktionsblock / oil filter 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 (intergated into the compressor)		

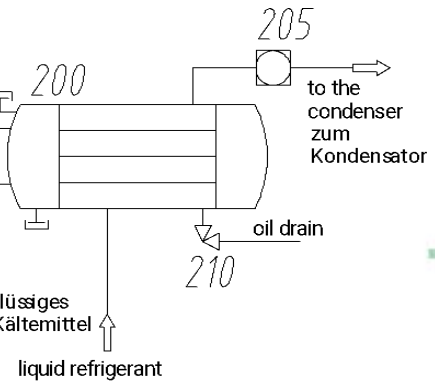
Optional equipment I



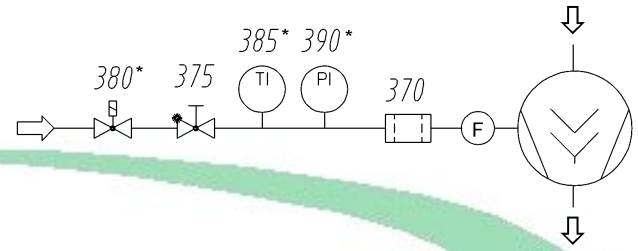
Optional equipment II

Kältemittel-gekühlte Ölkühler / Refrigerant cooled oil cooler

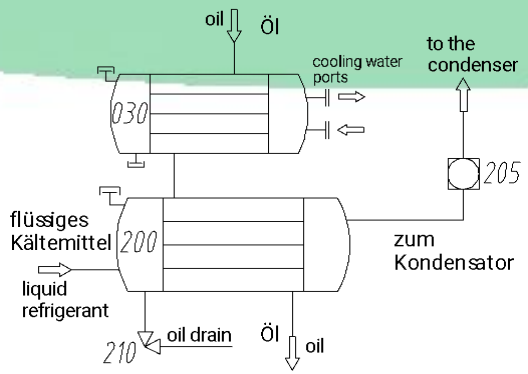




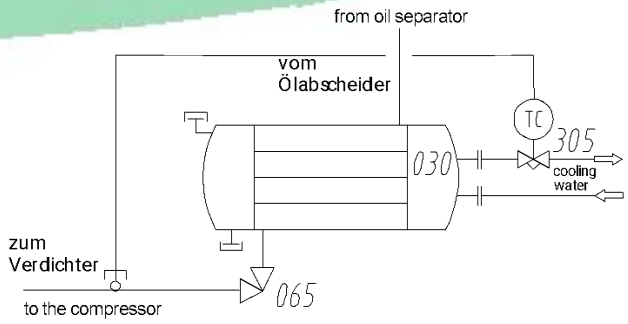
ECONOMIZER ANSCHLUß / ECONOMIZER OPERATION



Wärmerückgewinnung / Heat recovery

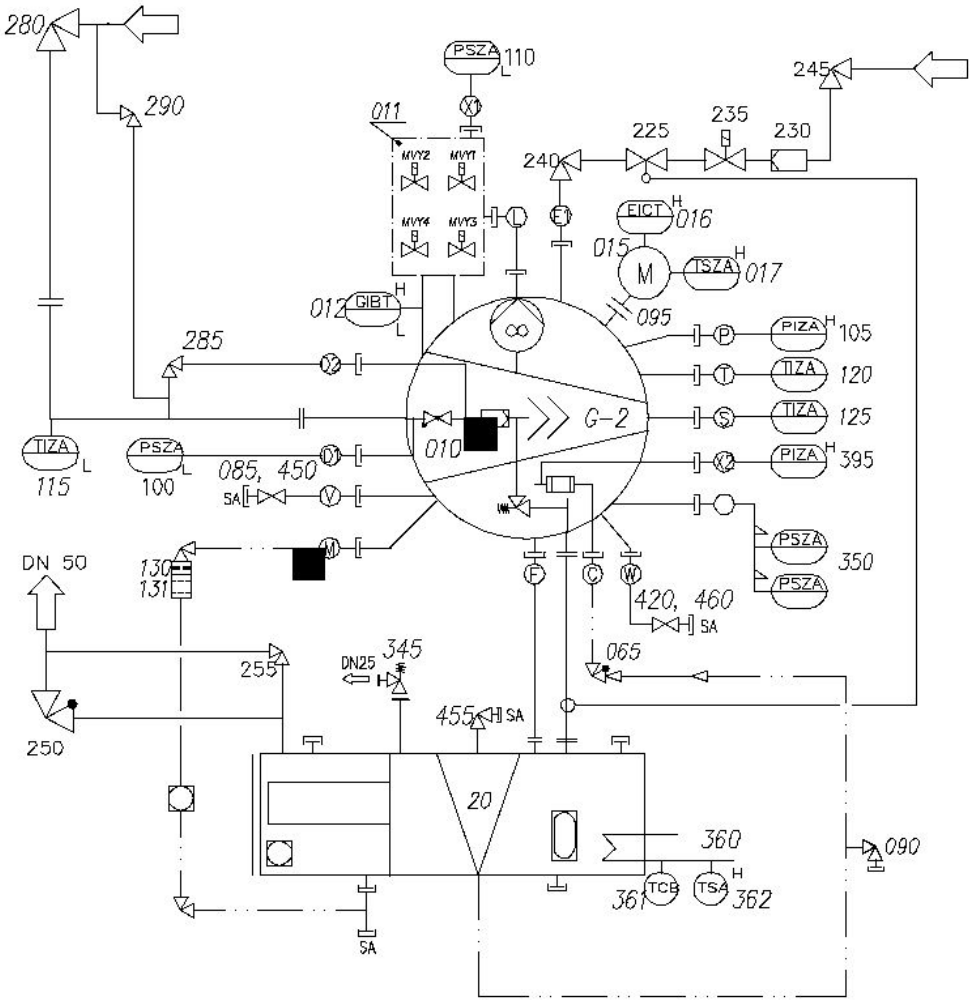


Kühlwasserregler / Thermostatic water valves

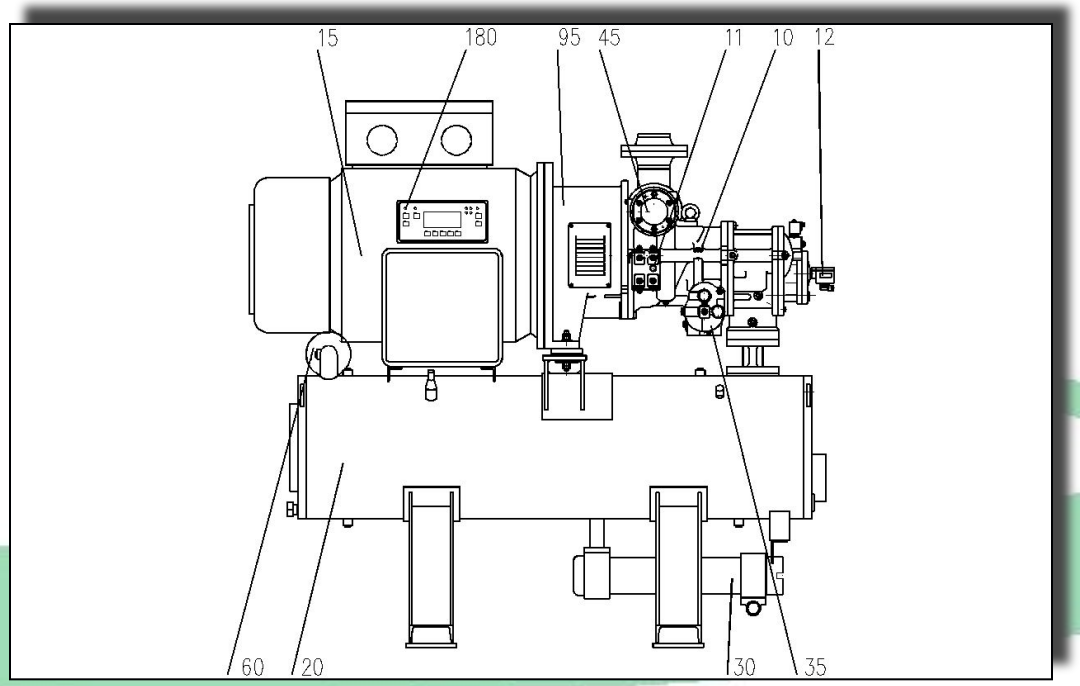


SMALL – Piping diagram

R+I Schema / P+I diagram

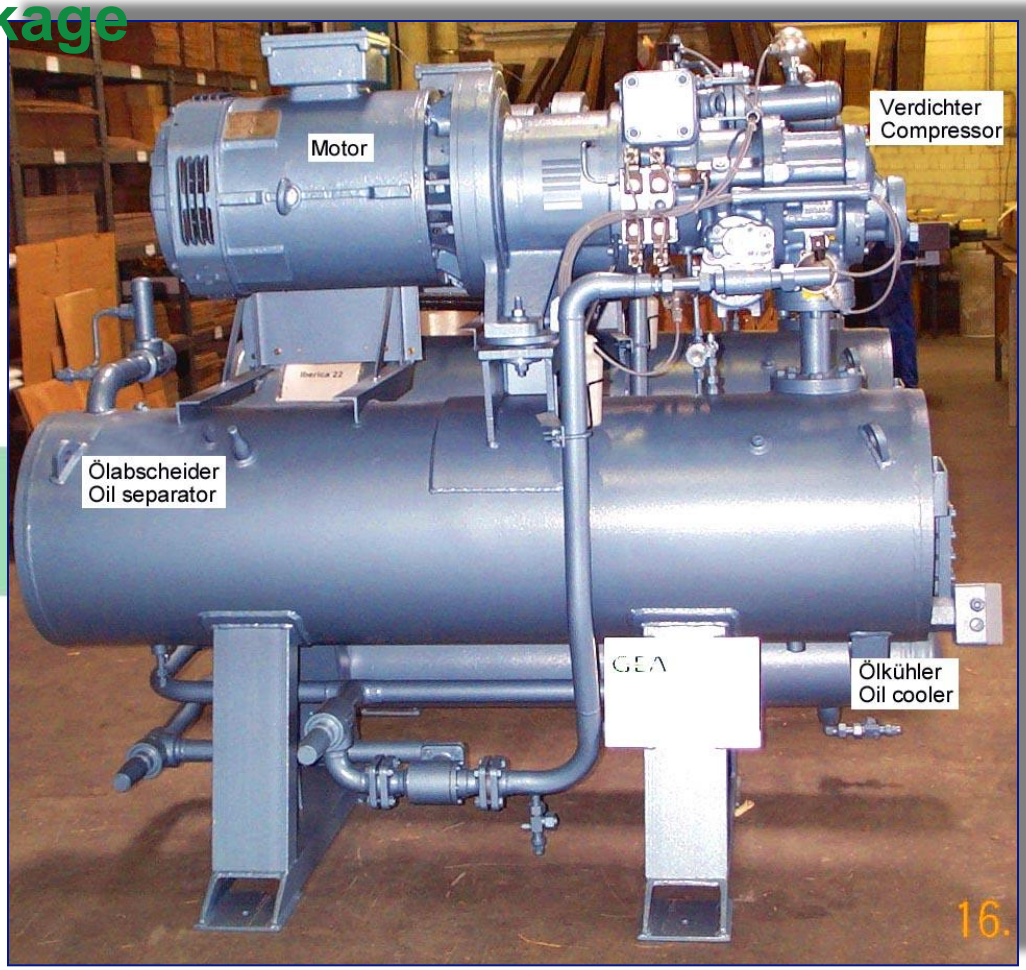


SMALL – components of Package

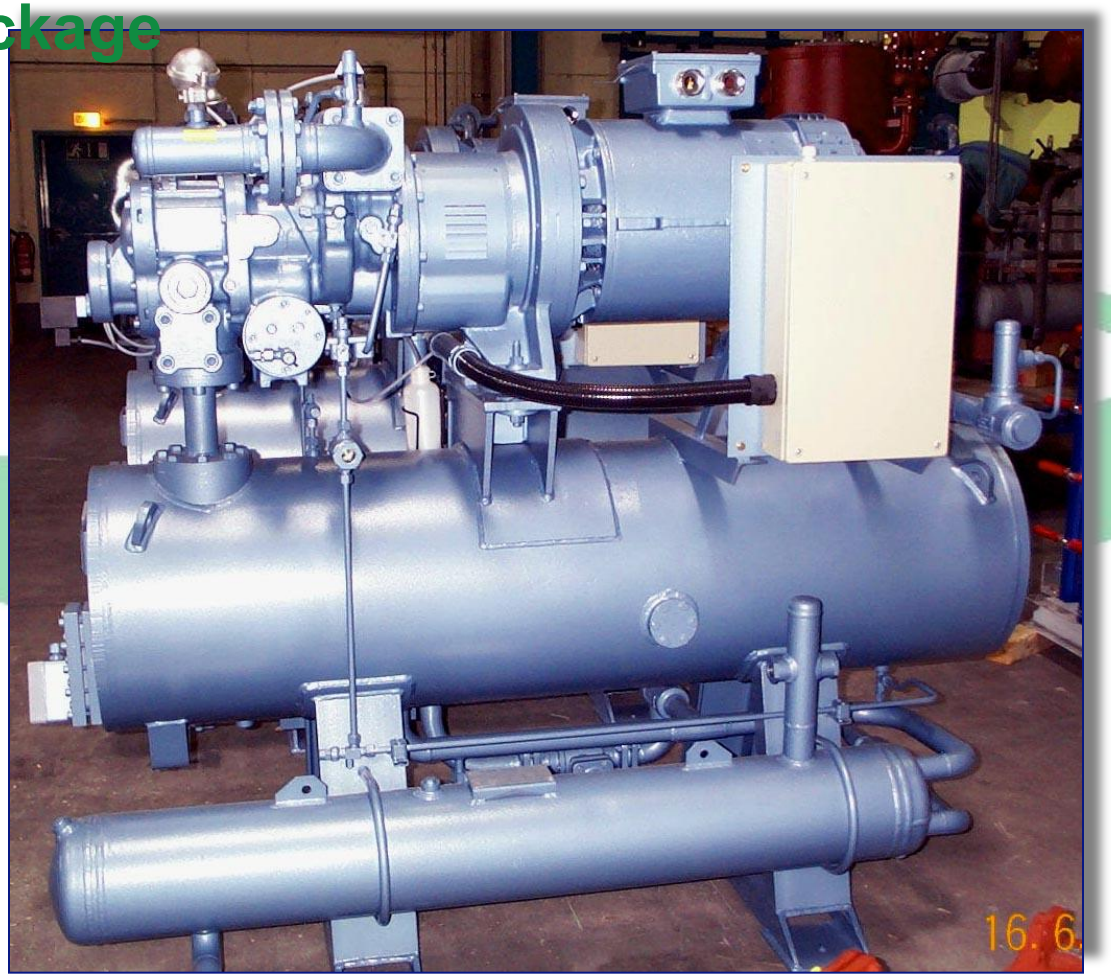


011	solenoid valve block	Magnetventilblock	045	suction filter (integrated)	Saugfilter (integriert)
012	position transducer	Wegsensor	055	check valve (integrated)	Rückschlagventil (integriert)
015	compressor motor	Antriebsmotor	060	check valve	Rückschlagventil
020	oil separator	Ölabscheider	080	control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

SMALL Verdichteraggregat / SMALL Package



SMALL Verdichteraggregat / SMALL Package



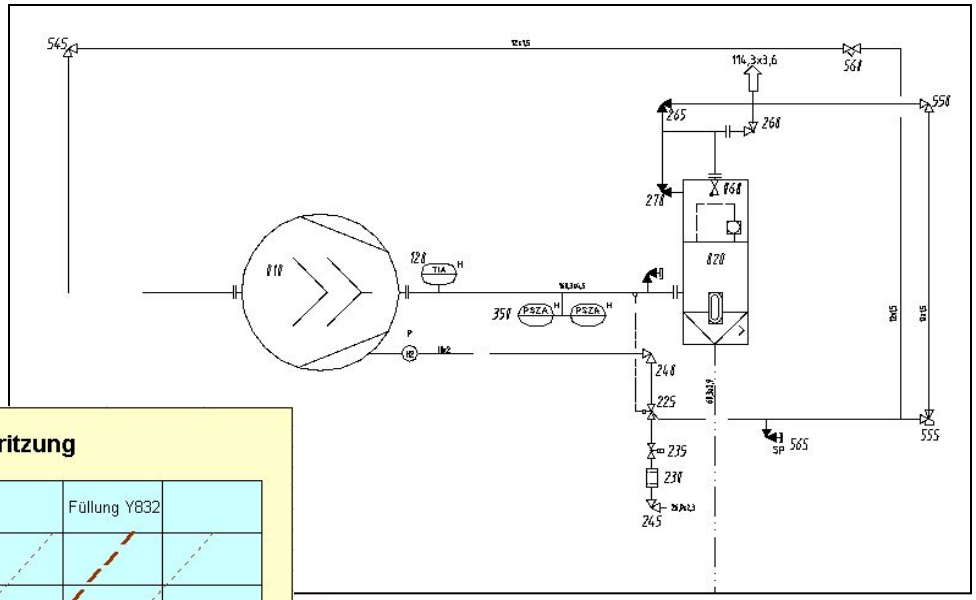
Kältemitteleinspritzung / Liquid injection

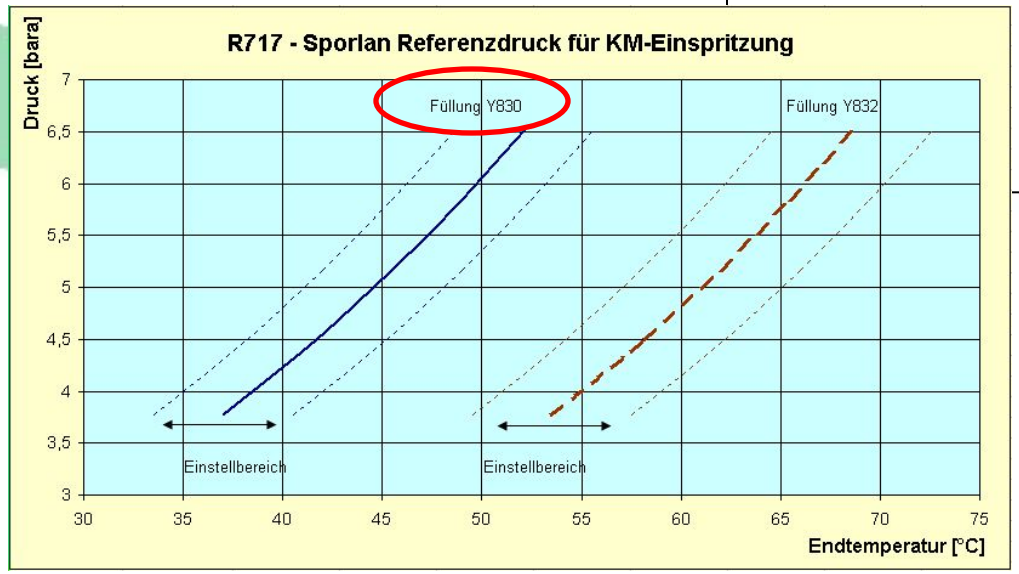
POS 550: Eckventil / angle valve

POS 555: Druckregulierventil
pressure regulating valve

POS 560: Nadelventil / needle valve

POS 225: Thermostatisches Expansionsventil
thermostatic expansion valve





DUO Pack

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

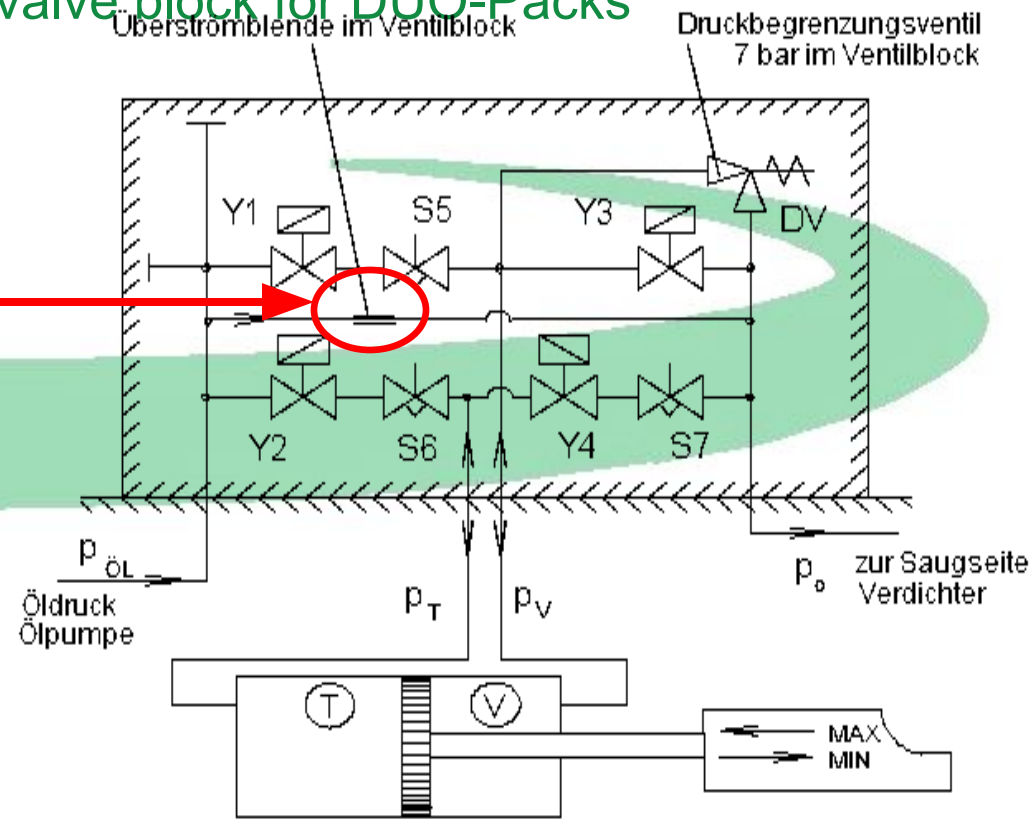
DUO Pack - solenoid valve block

Magnetventilblock für Duo-Pack

Solenoid valve block for DUO-Packs

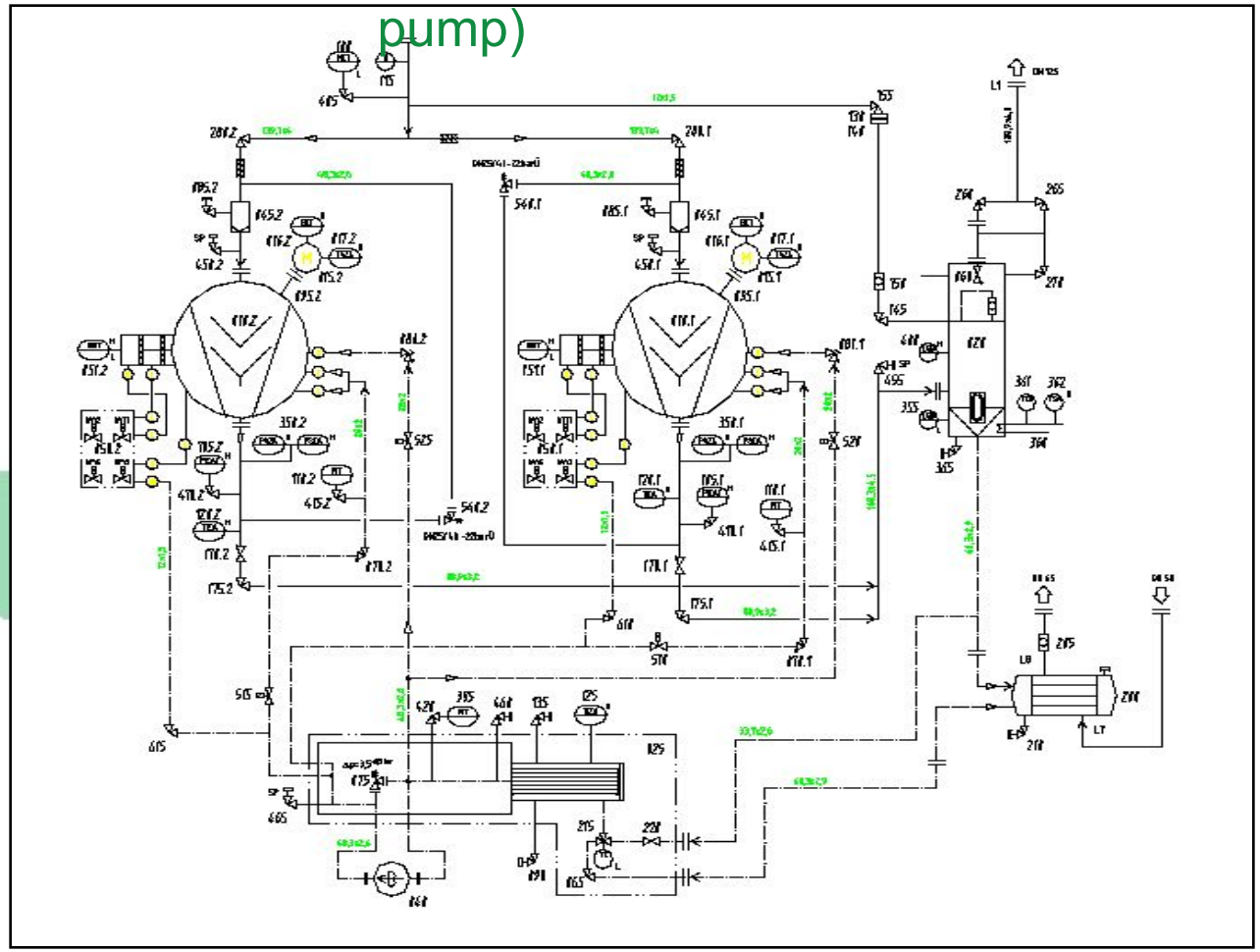
Verschlußstück statt Überstromblende

Closing piece instead of orifice

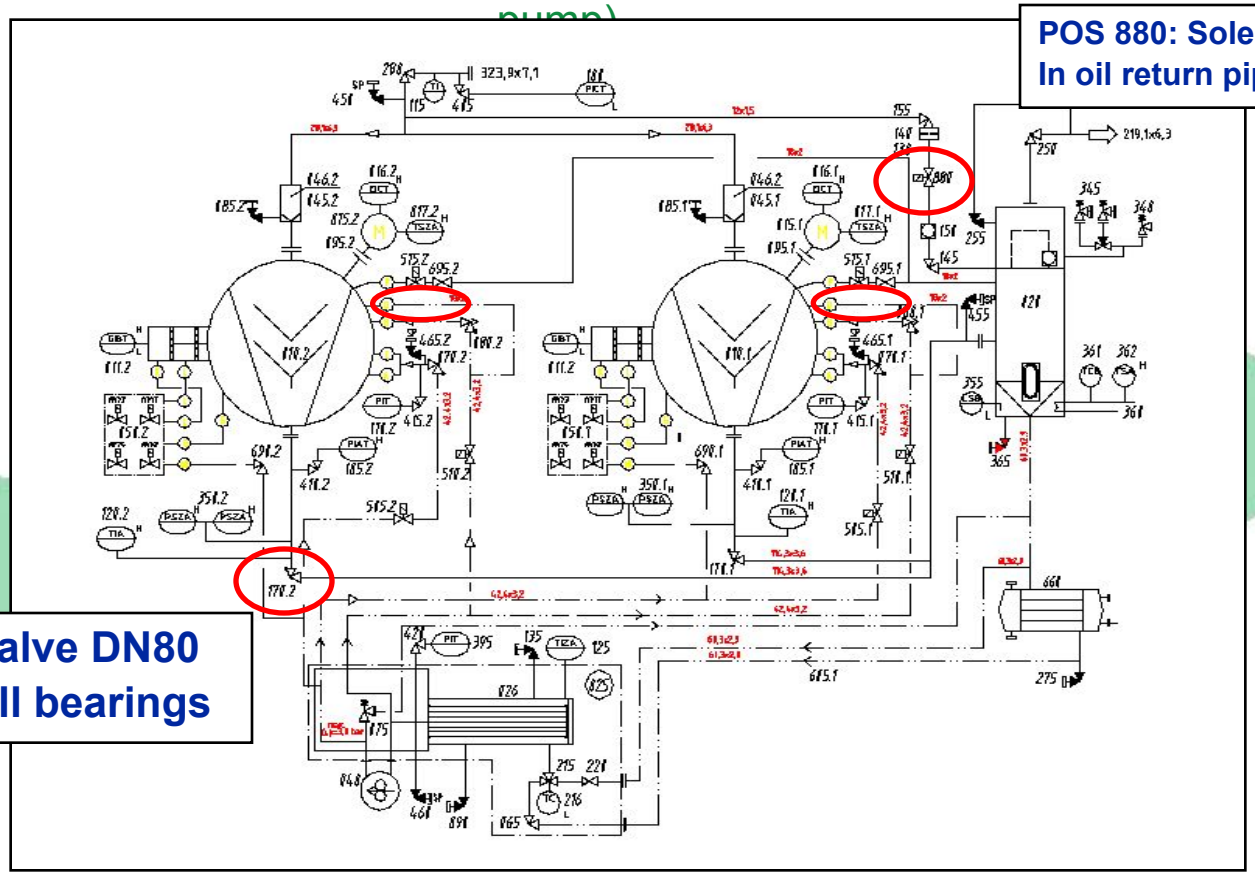


LARGE Duo-Pack (Externe Ölpumpe / external oil pump)

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

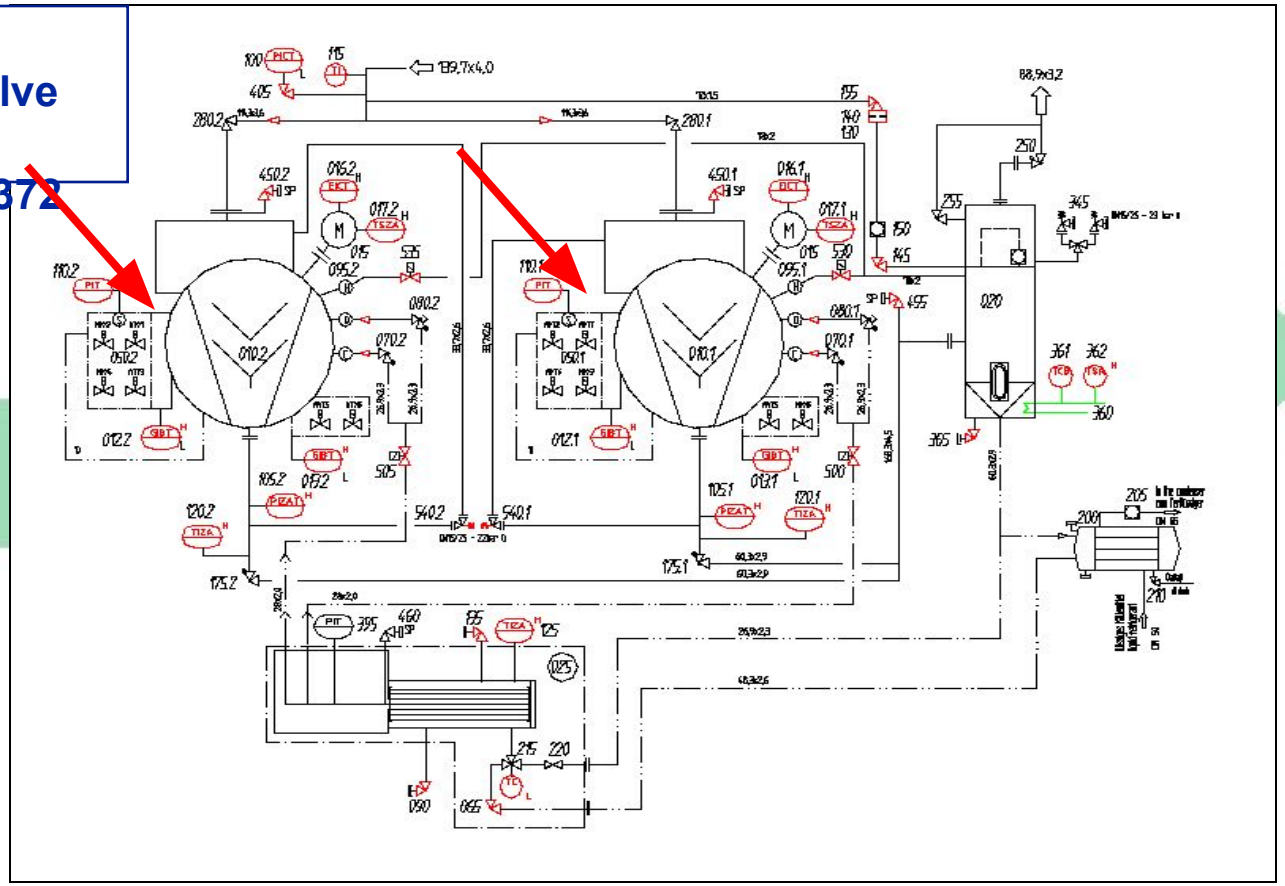
~11/ 2002:

- **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

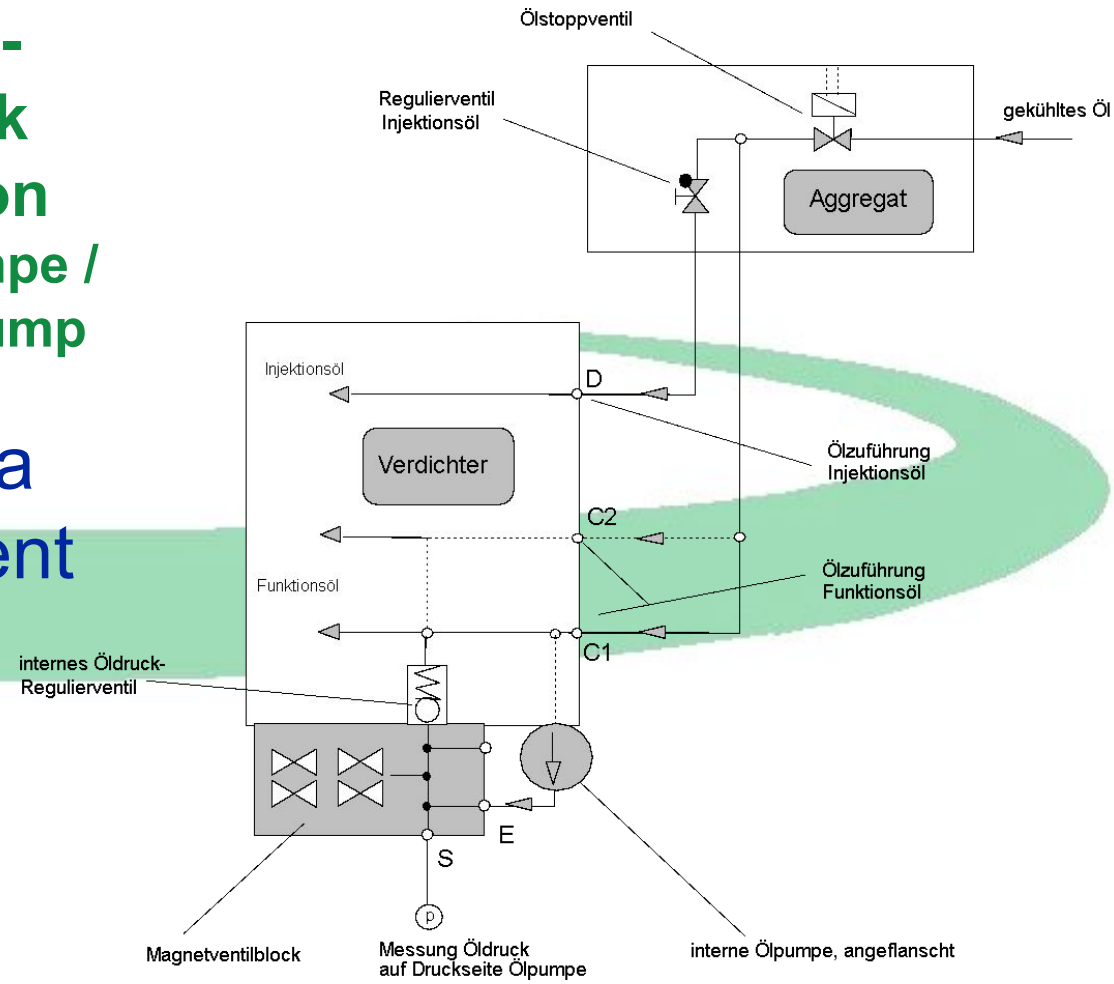


MEDIUM - DUO-Pack Old Version

Interne Ölpumpe / Internal oil pump

Schaltschema Oil management

MD11

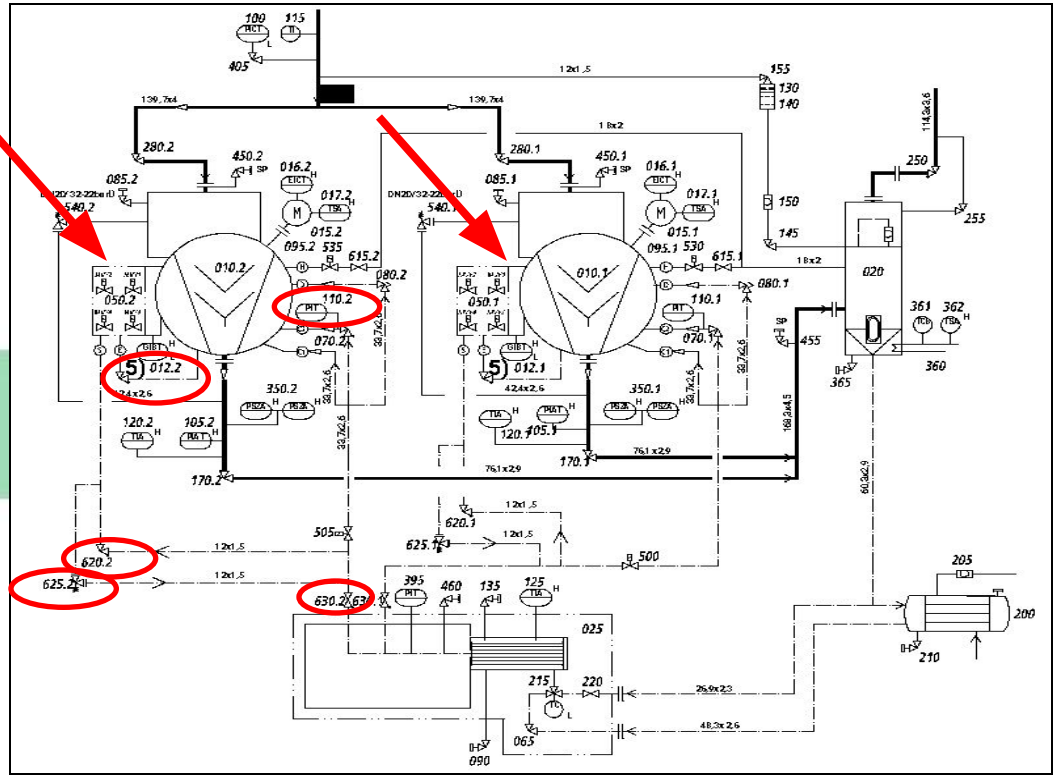


Medium Duo-Pack

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 valve**
- **Pos 620 Rückschlagventil / check valve**
- **Pos 625 Öldruckregulierventil/ oil pressure regulating valve**
- **Leitung E (& Rückschlagventil) Piping E (& check valve)**



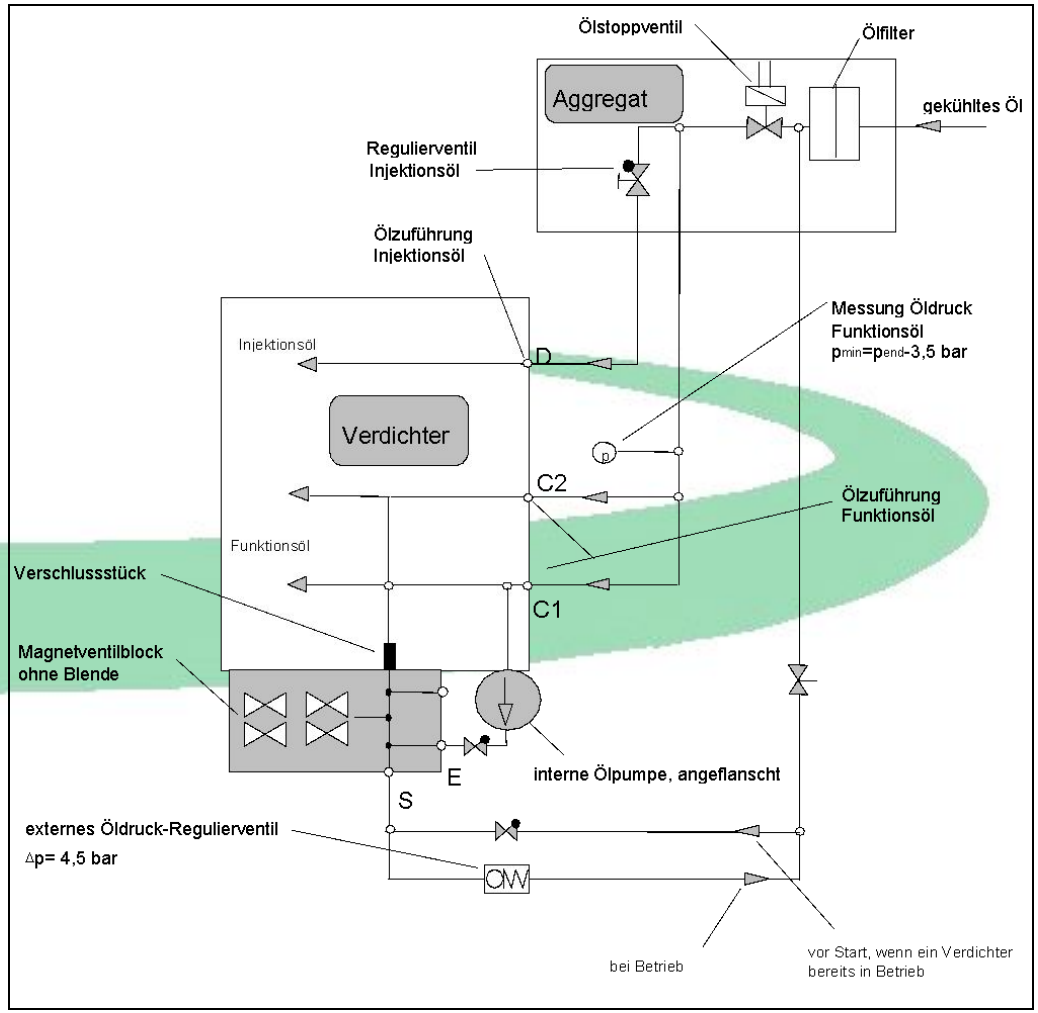
MEDIUM - DUO-Pack NEW VERSION

Interne Ölpumpe / Internal oil pump

Schaltschema

Oil management

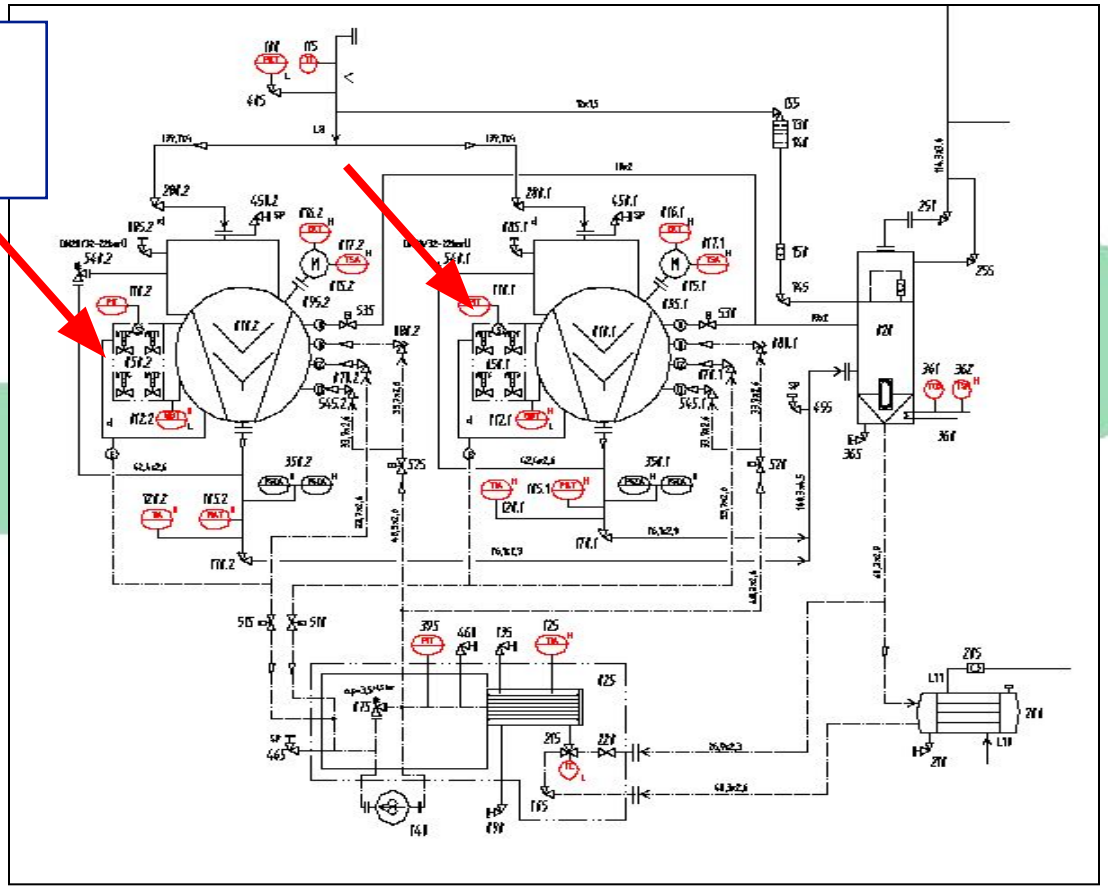
MD11-R1



Medium Duo-Pack

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

Standard Solenoid valve block
ID: 501 298 372



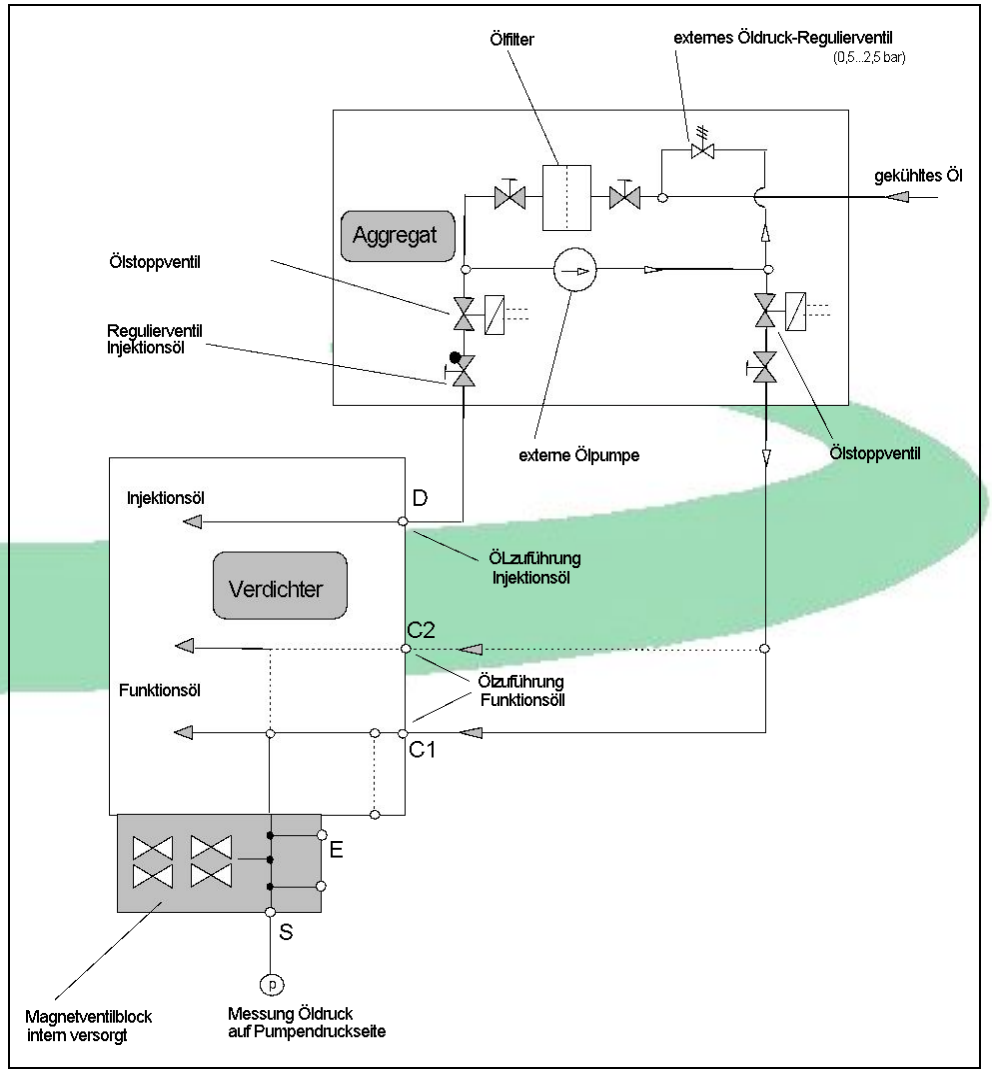
MEDIUM - DUO-Pack OLD VERSION

Externe Ölpumpe / External oil pump

Schaltschema

Oil management

MD12

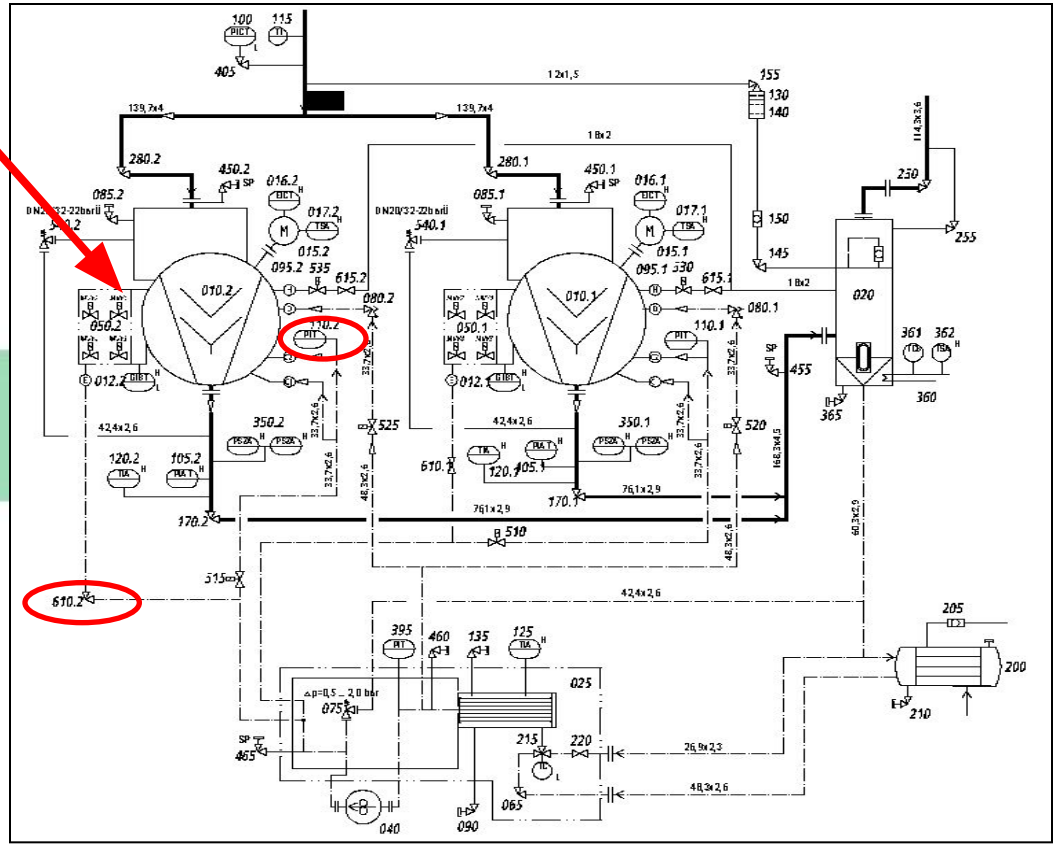


Medium Duo-Pack

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**

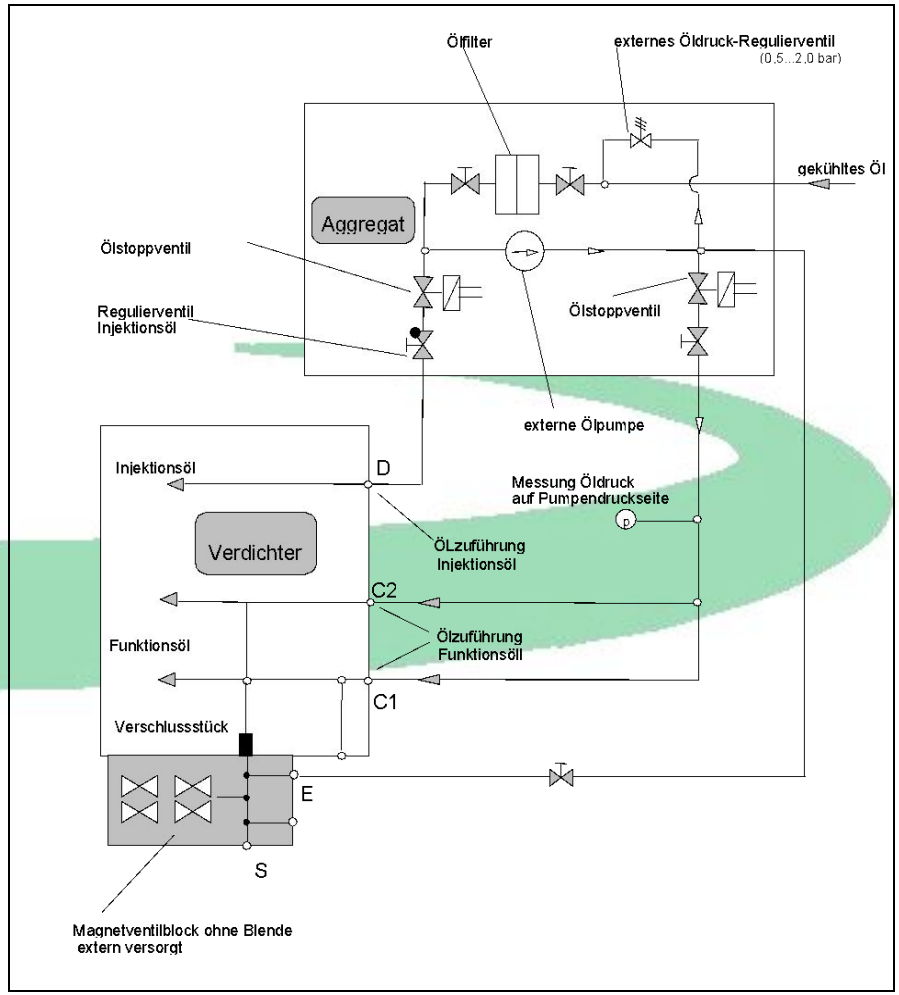


MEDIUM - DUO-Pack NEW VERSION

Externe Ölpumpe / External oil pump

Schaltschema Oil management

MD12-R1



SMALL DUO-Pack

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

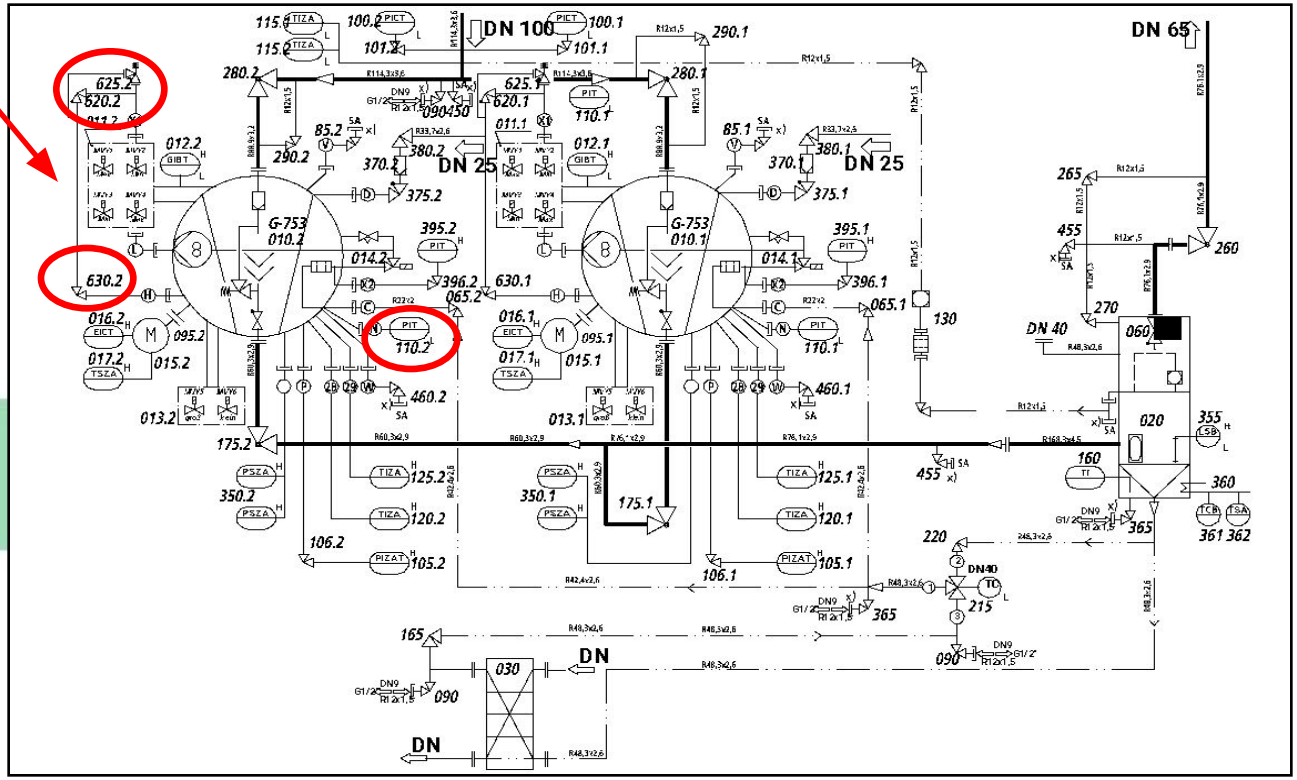
INTRODUCTION :

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**

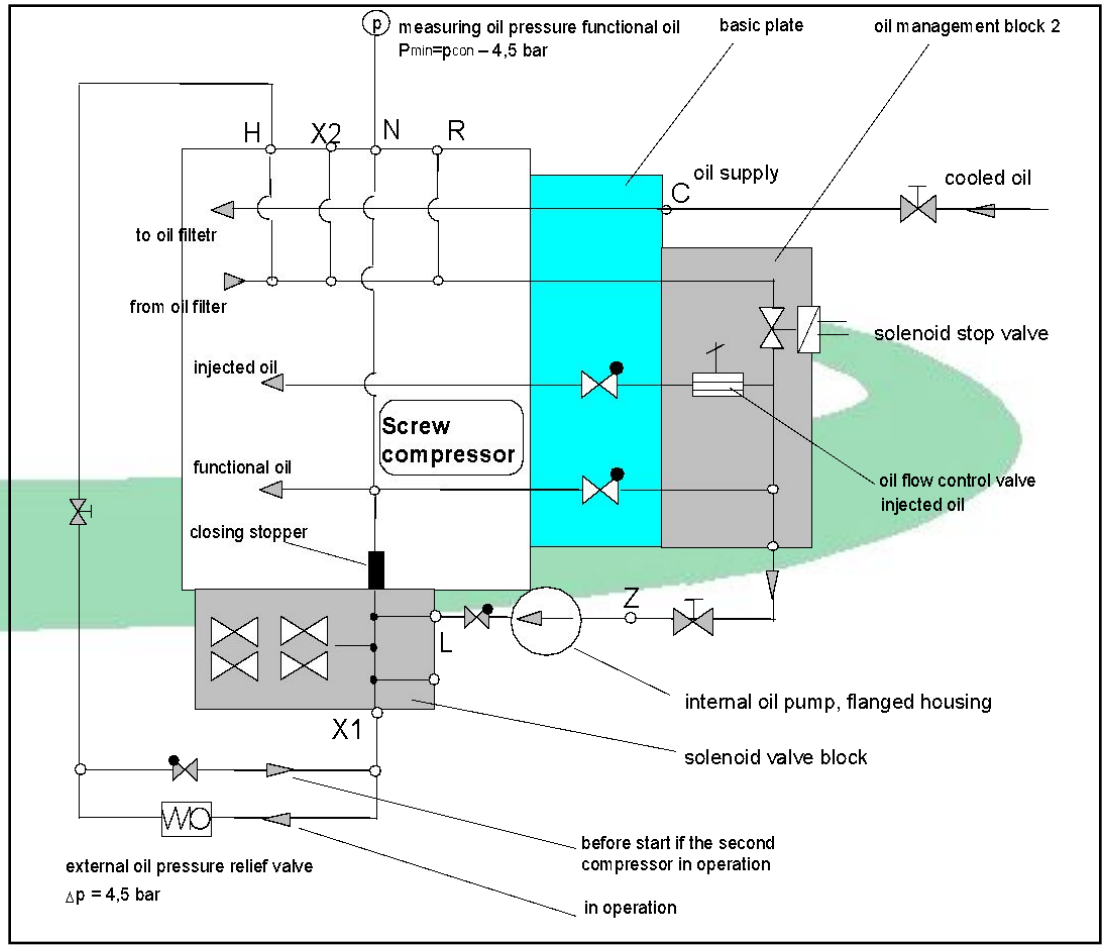


SMALL - DUO-Pack NEW VERSION

interne Ölpumpe / internal oil pump

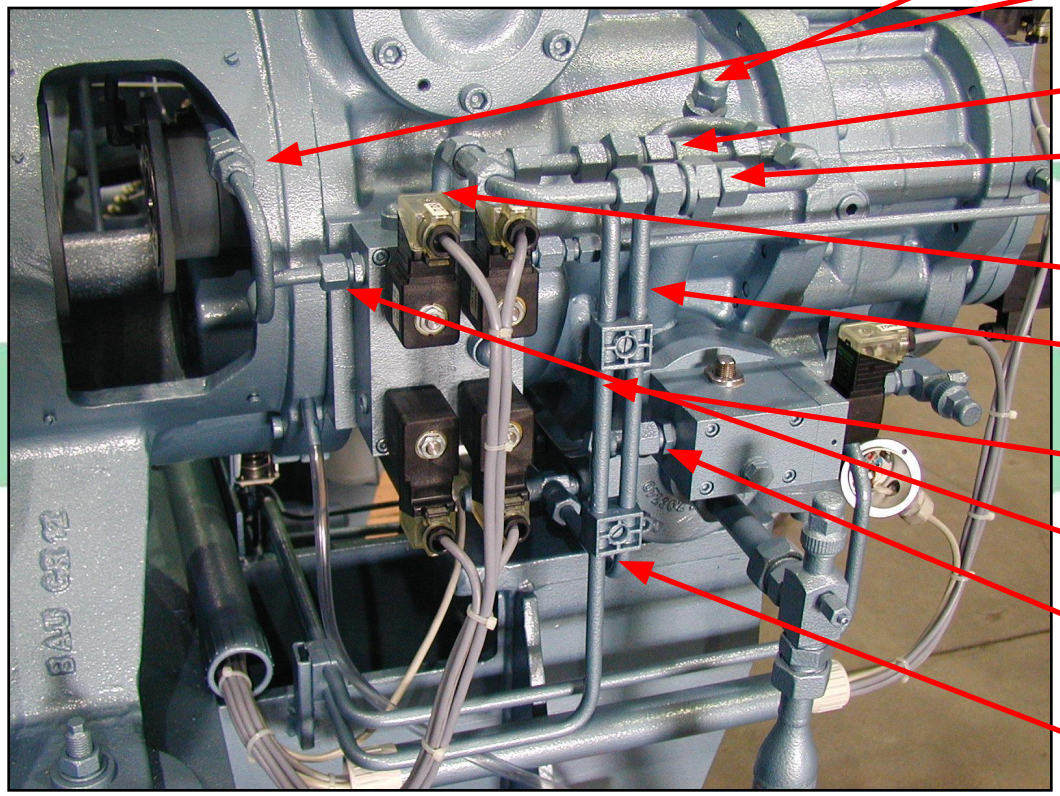
Schaltschema Oil management

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

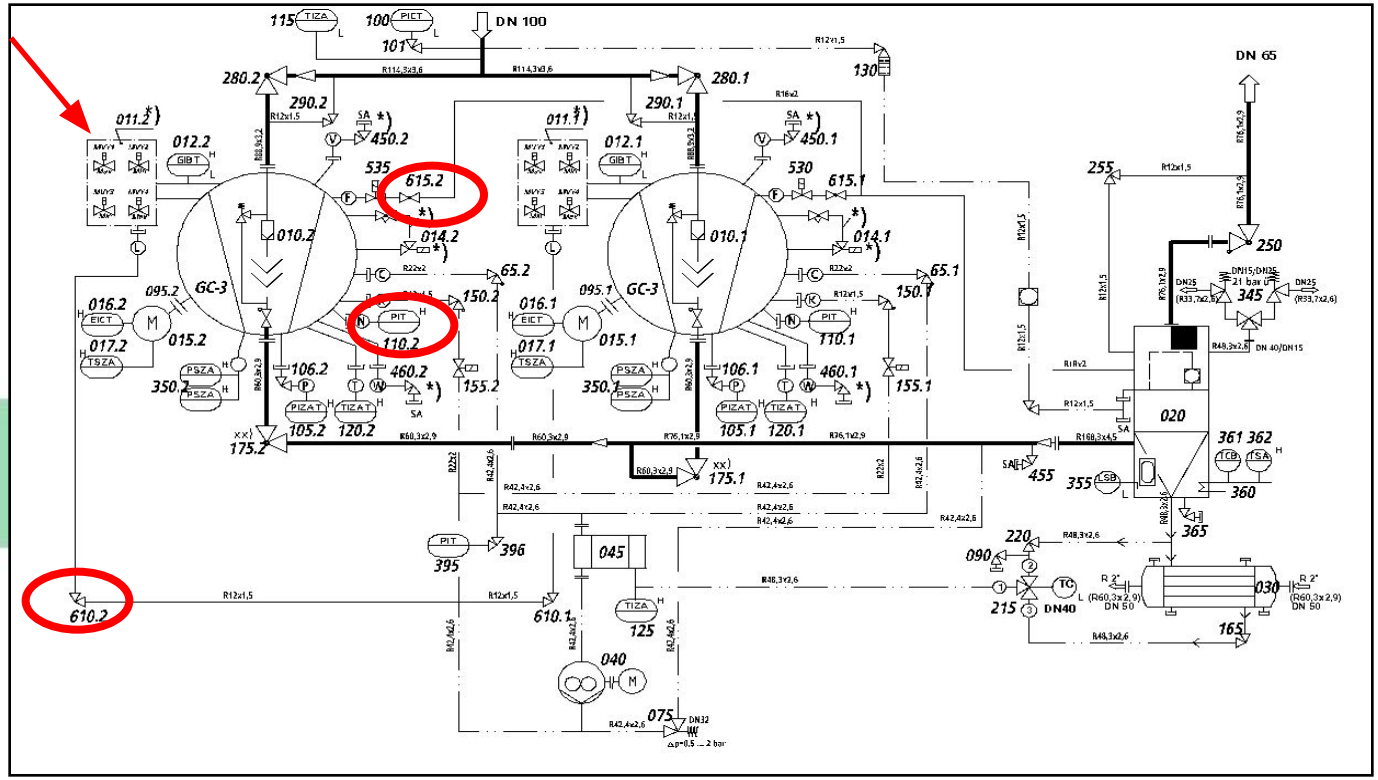
Externe Ölpumpe (neue Version)/ external oil pump (new version)

INTRODUCTION:
09 / 2001

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

- **Pos 110:**
- **new position oil pressure sensor**

- **Pos 610 / 615 stop valves**

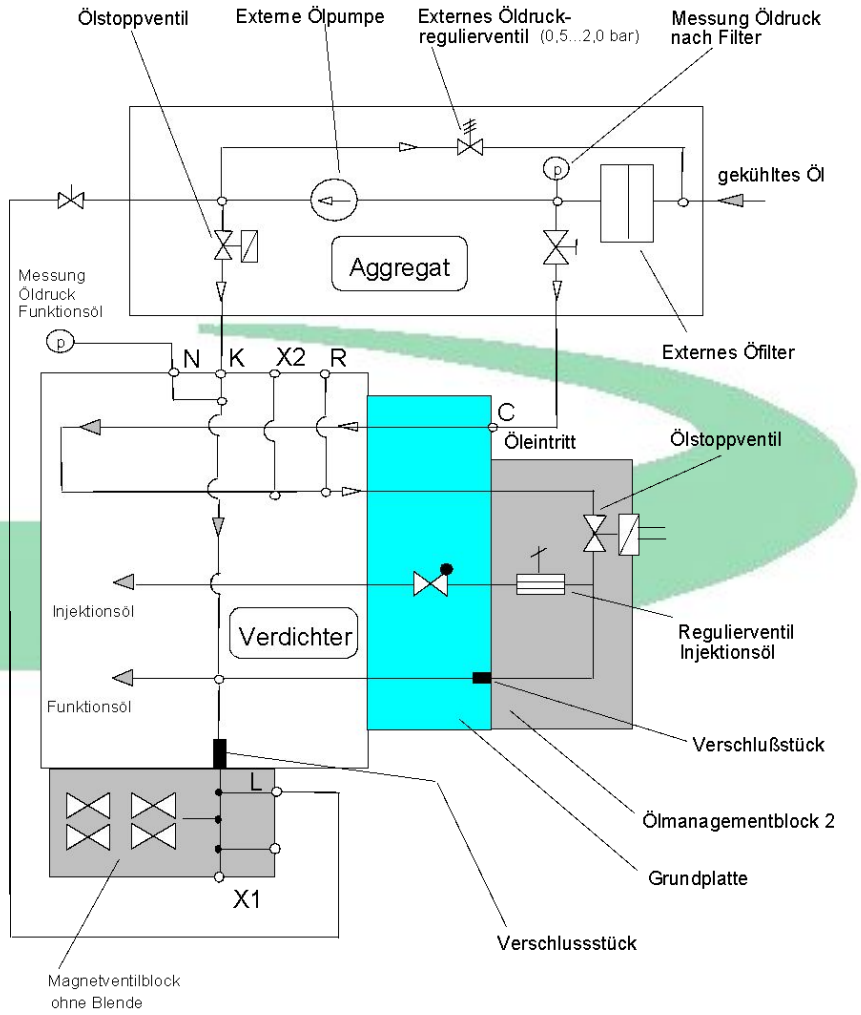


SMALL - DUO-Pack NEW VERSION

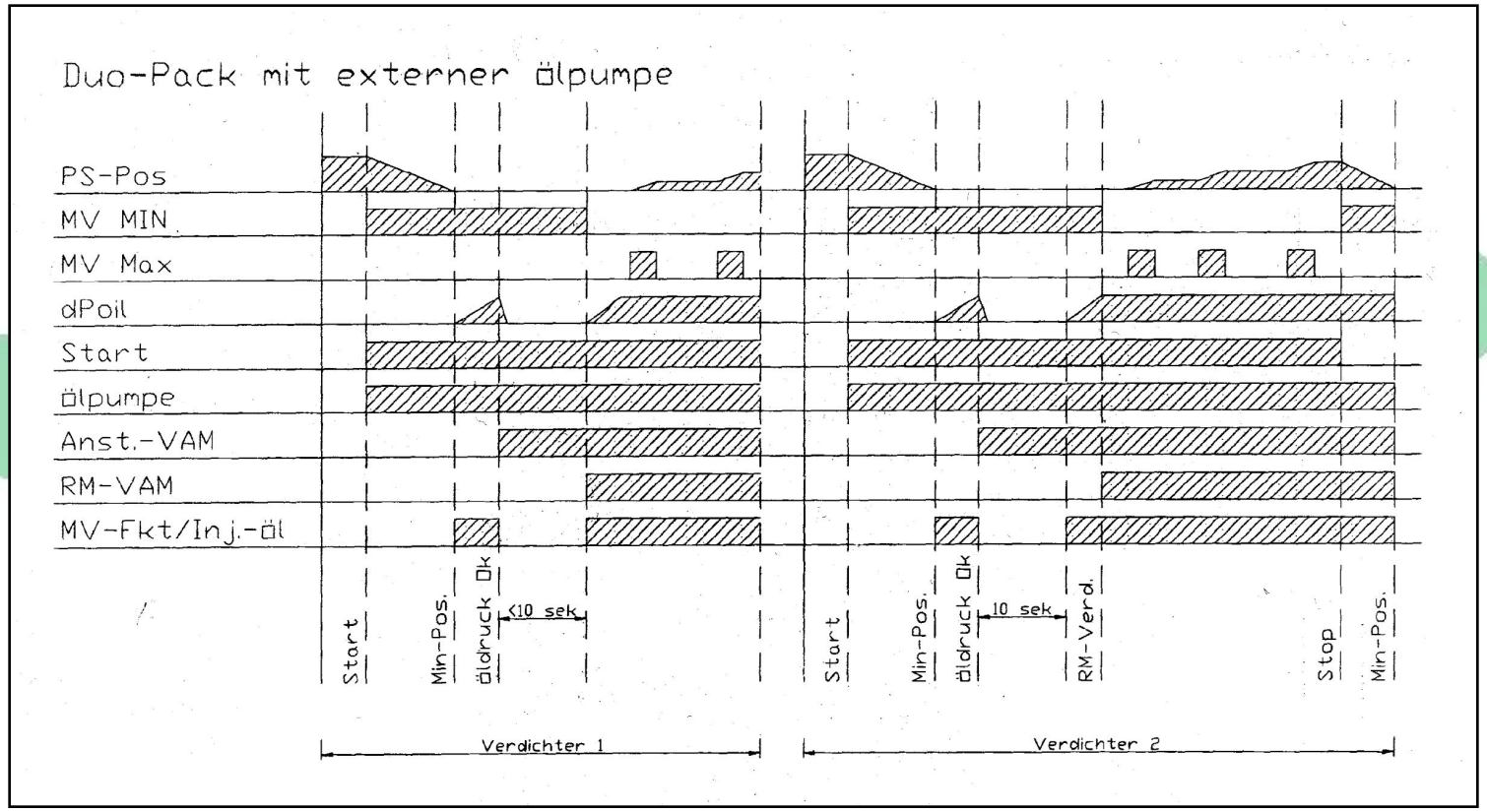
Externe Ölpumpe / External oil pump

Schaltschema Oil management

SD12-R1



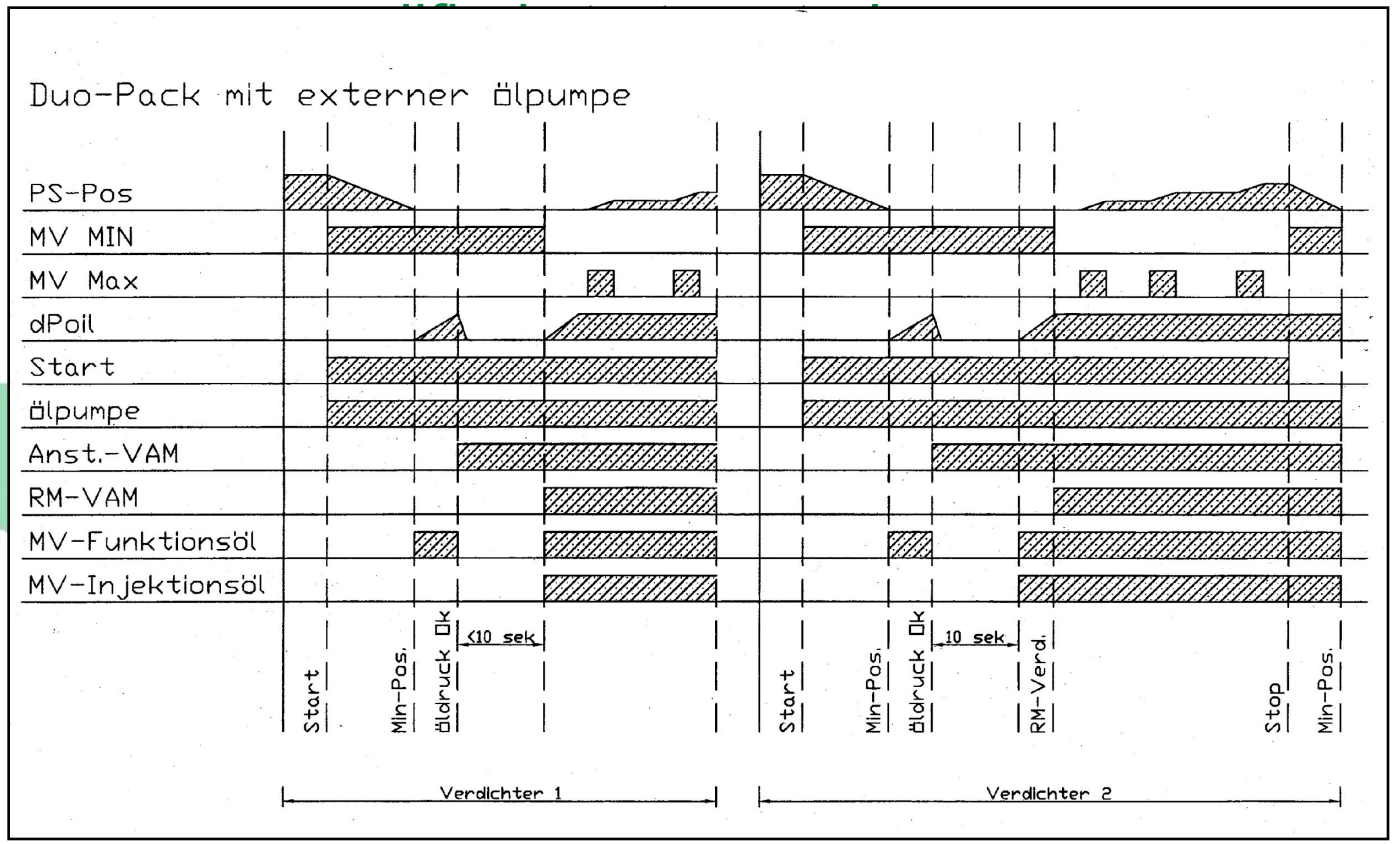
LARGE-Duo-Pack - ext. oilpump - start control



LARGE-Duo-Pack – external oil pump

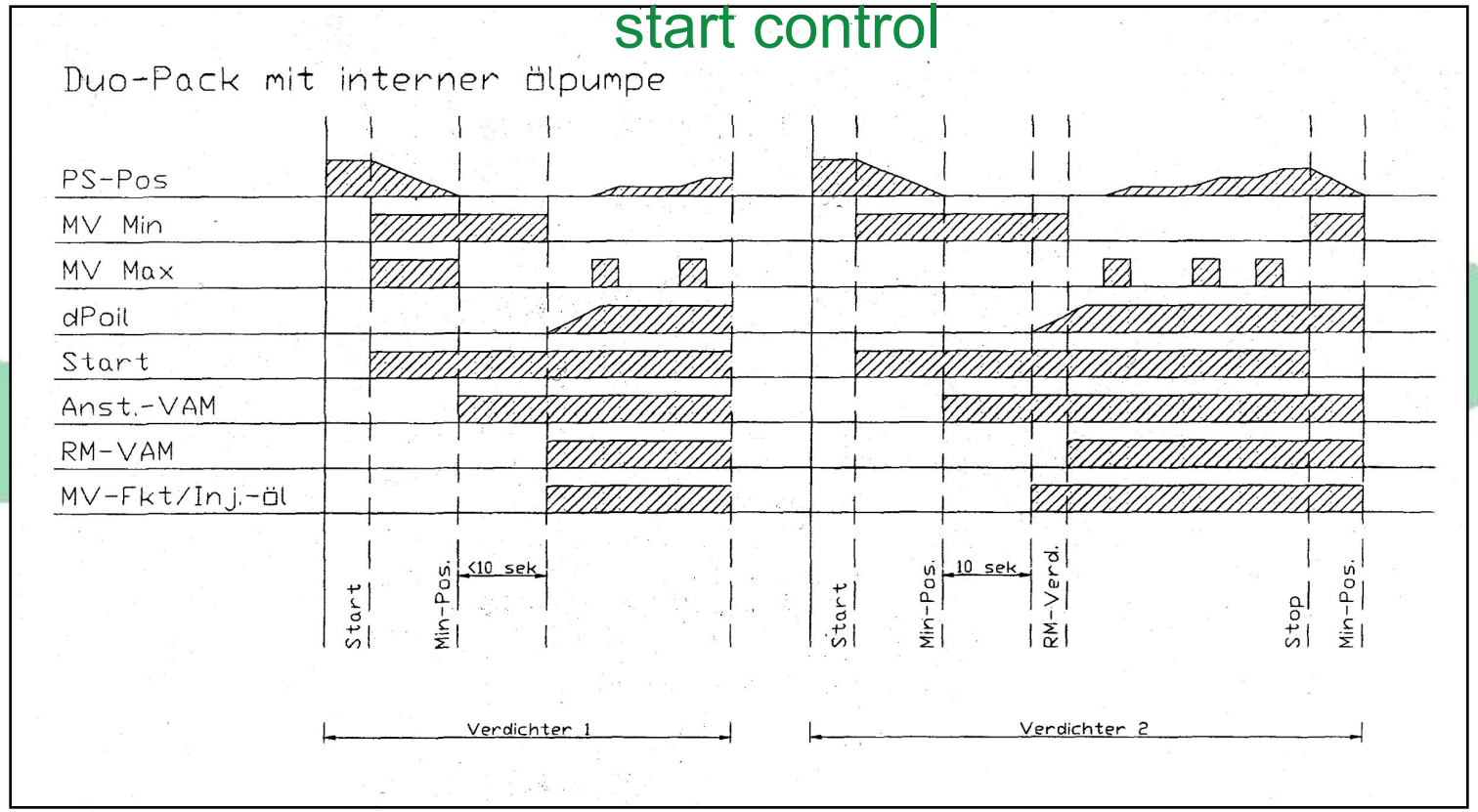
Einführung/ Introduction:

~09 / 2002

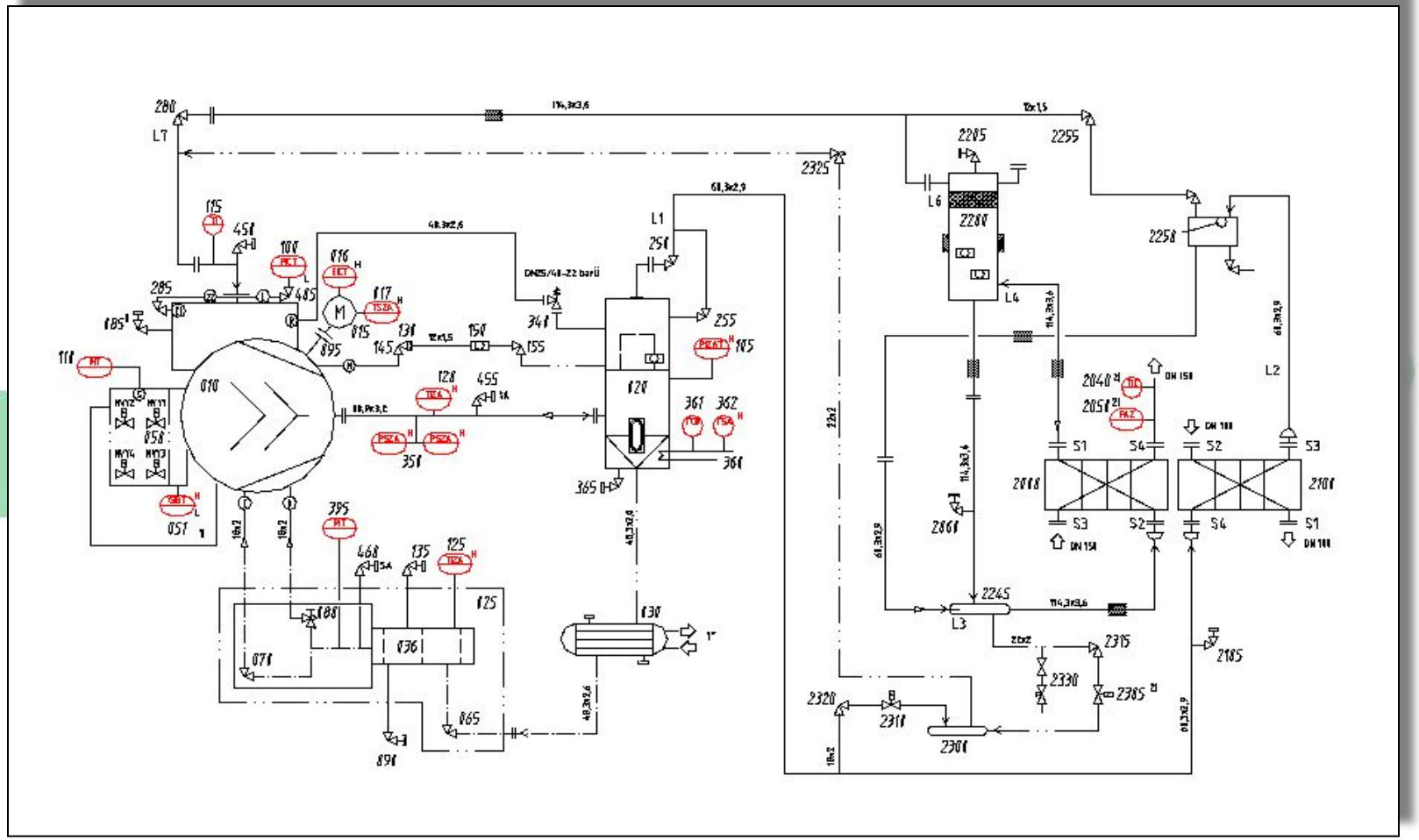


Duo-Pack – internal oil pump

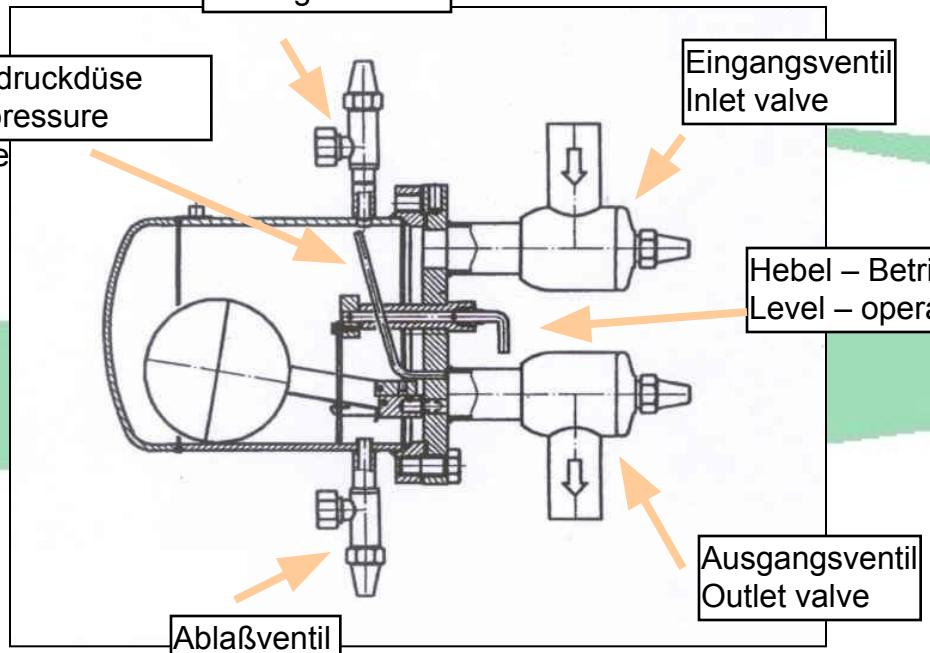
start control



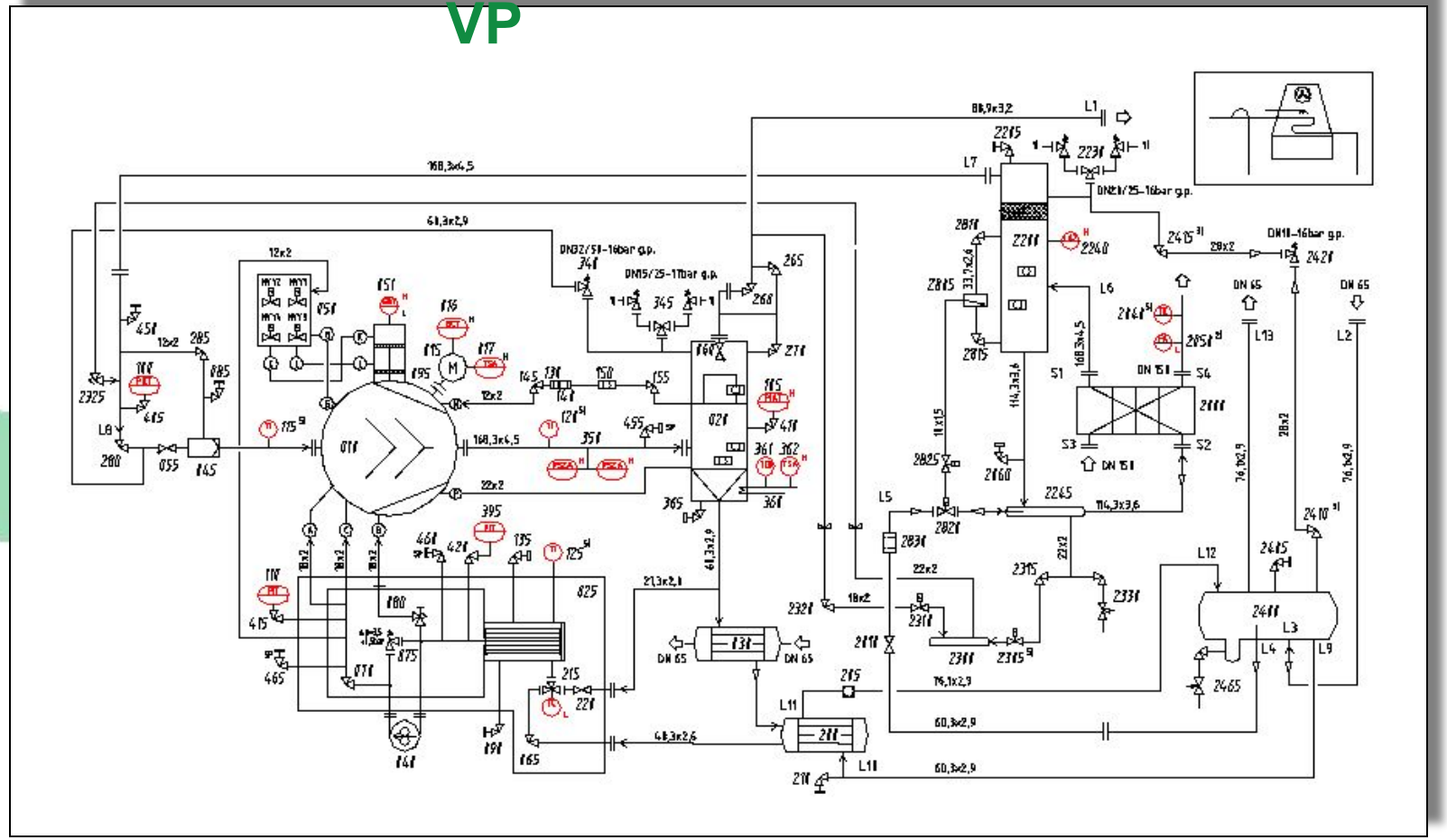
FKS /Chiller – FX



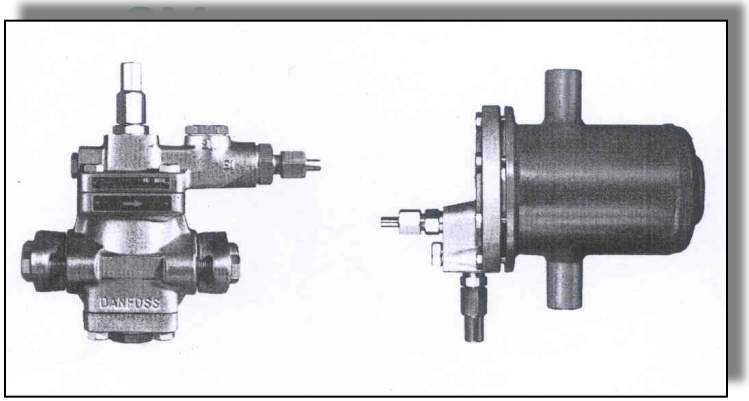
Hochdruckschwimmer /High pressure float

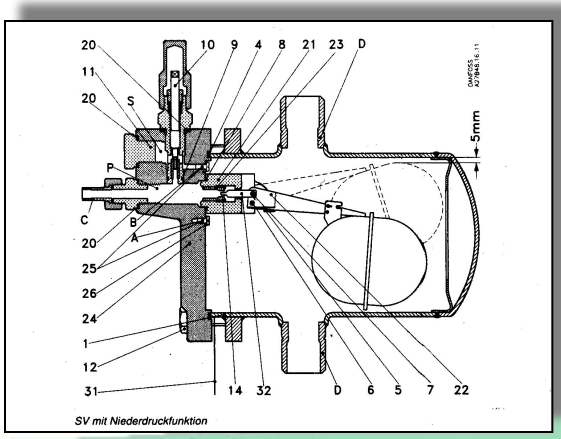


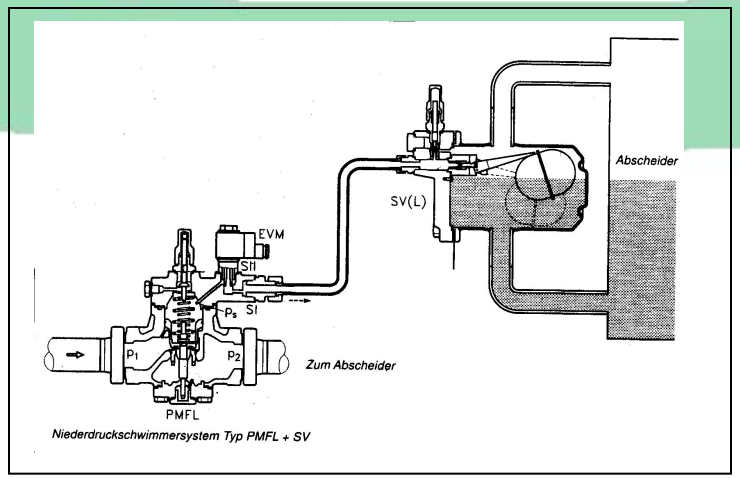
FKS /Chiller – FX VP

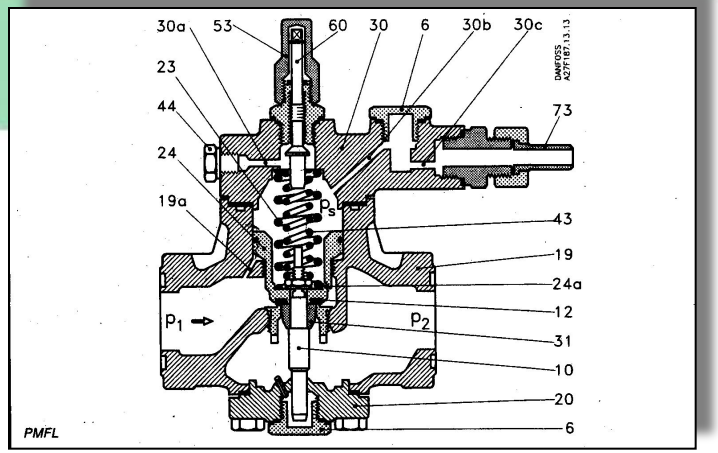


Niveauregler /liquid level control - PMFL &

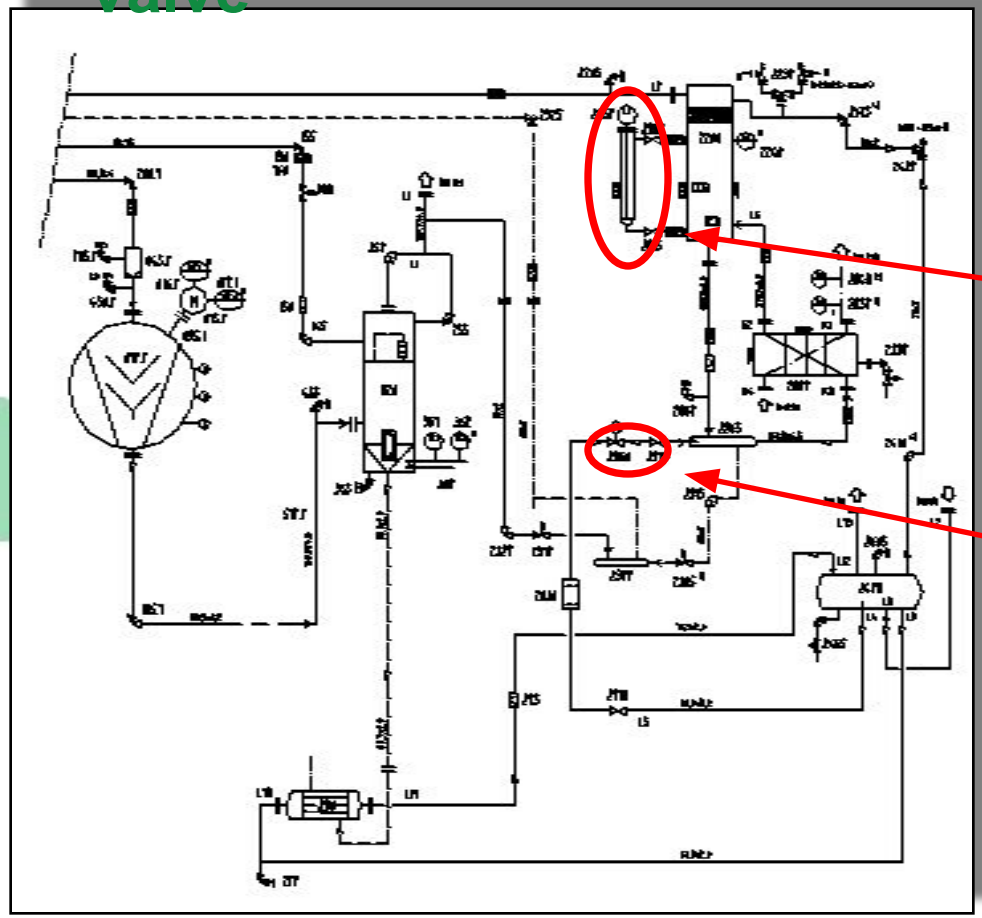








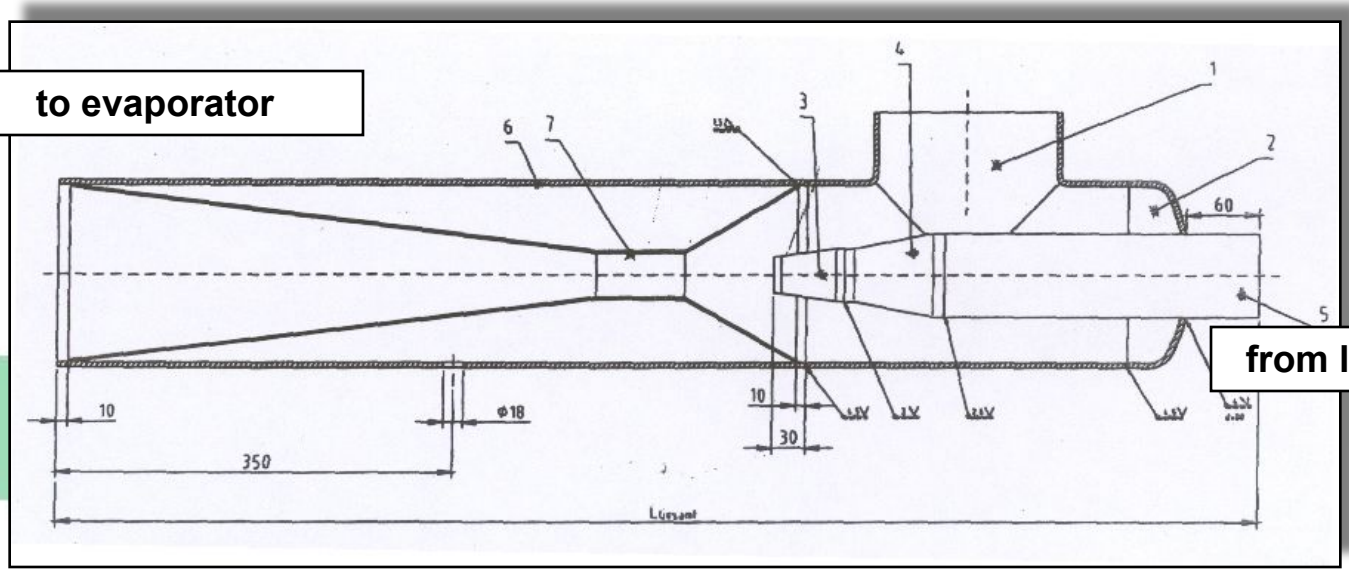
Niveauregler /liquid level control – RTK motor valve



Injecto
r

from liquid separator

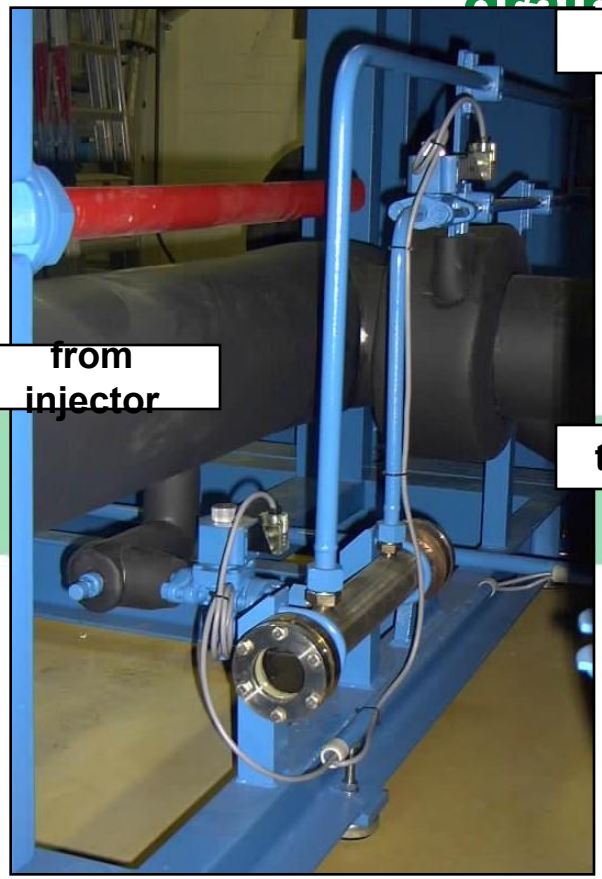
to evaporator



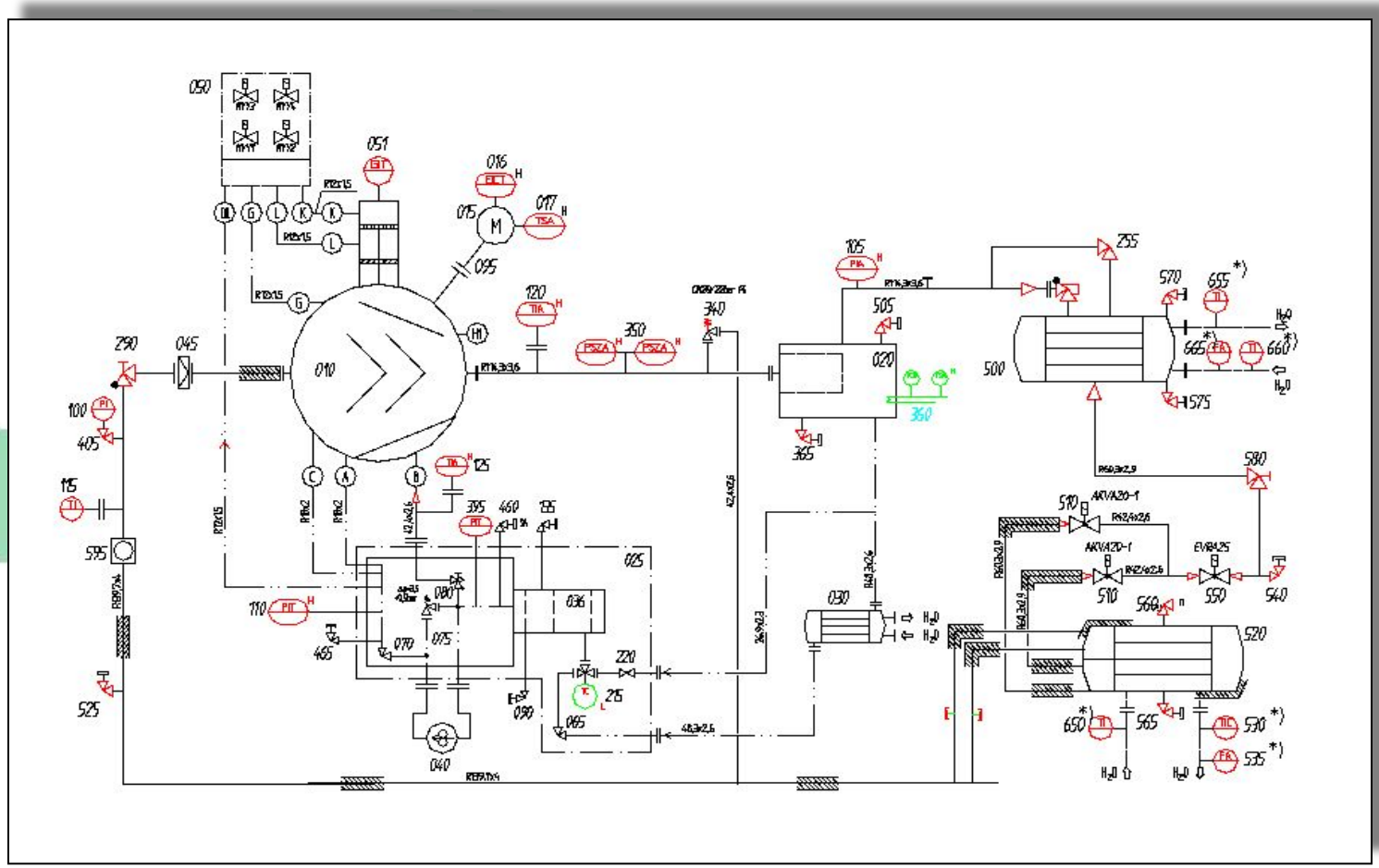
from liquid receiver

to drainer

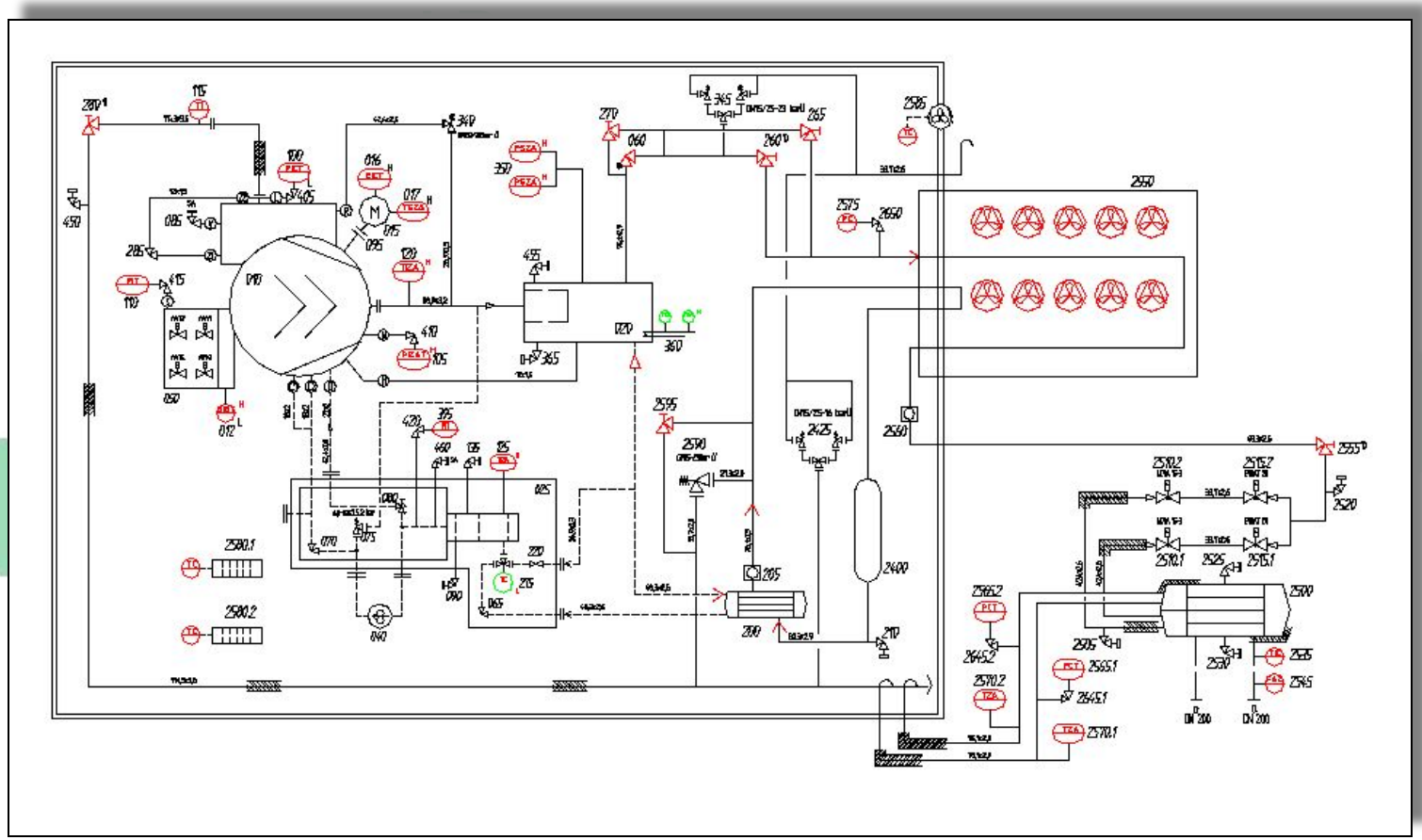
Entöler / drainer



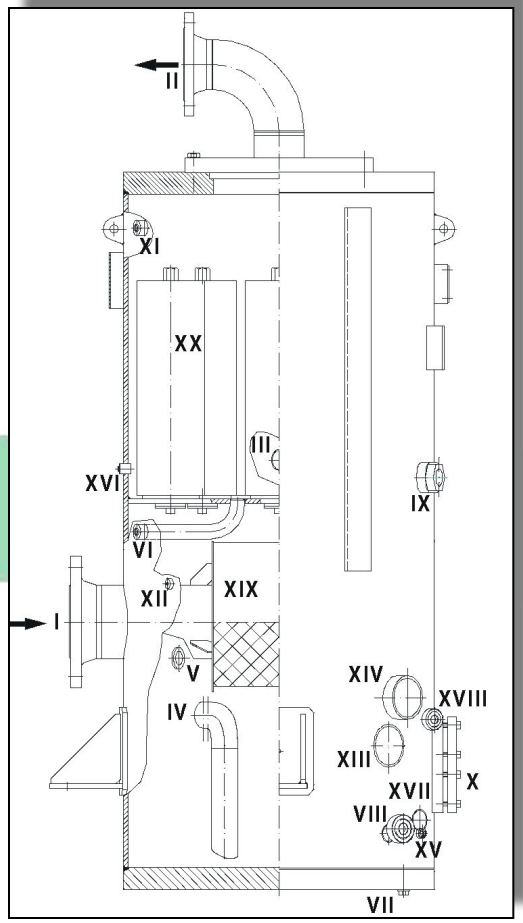
FKS /Chiller – DX



FKS /Chiller – DX

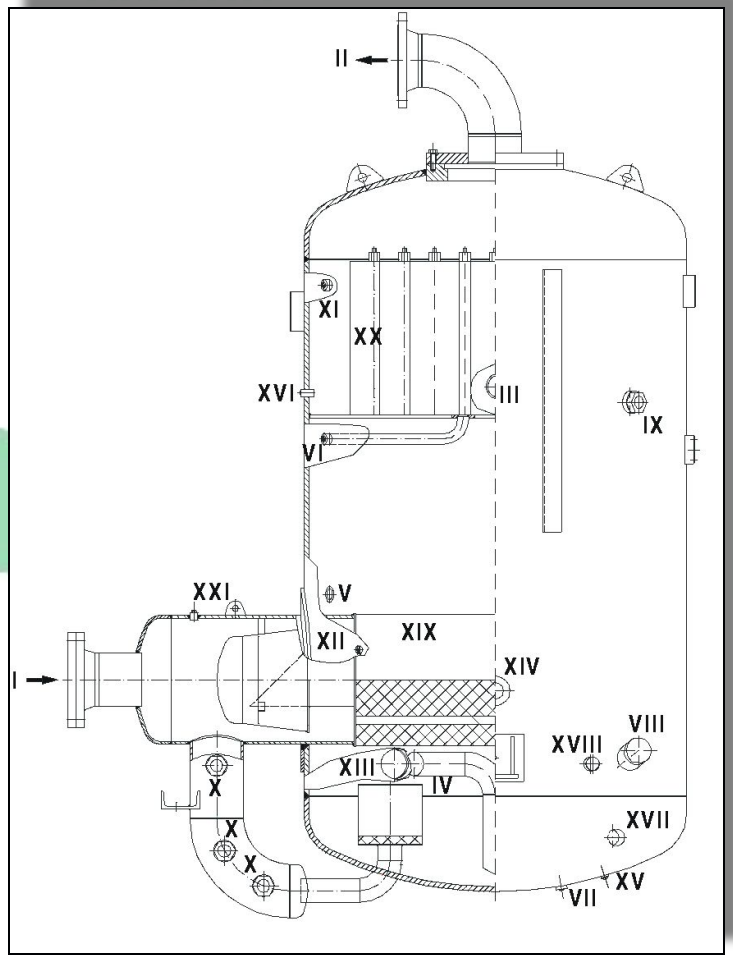


Ölabscheider / oil separator: Ø508, Ø711, Ø812



I	Kältemitteleintritt	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	Niveauwächter MIN.I	Level controller MIN.I
XIV	Niveauwächter MAX.I	Level controller MAX.I
XV	Öltemperatur – Ölsammler	Oil temperature – oil receiver
XVI	Sicherheitsdruckbegrenzer	Safety pressure limiter
XVII	Niveauwächter MIN.II	Level controller MIN.II
XVIII	Niveauwächter MAX.II	Level controller MAX.II
XIX	Agglomerator	Agglomerator
XX	Feinabscheidepatronen	Fine separation cartridges

Ölabscheider / oil separator: Ø1016, Ø1200, Ø1400



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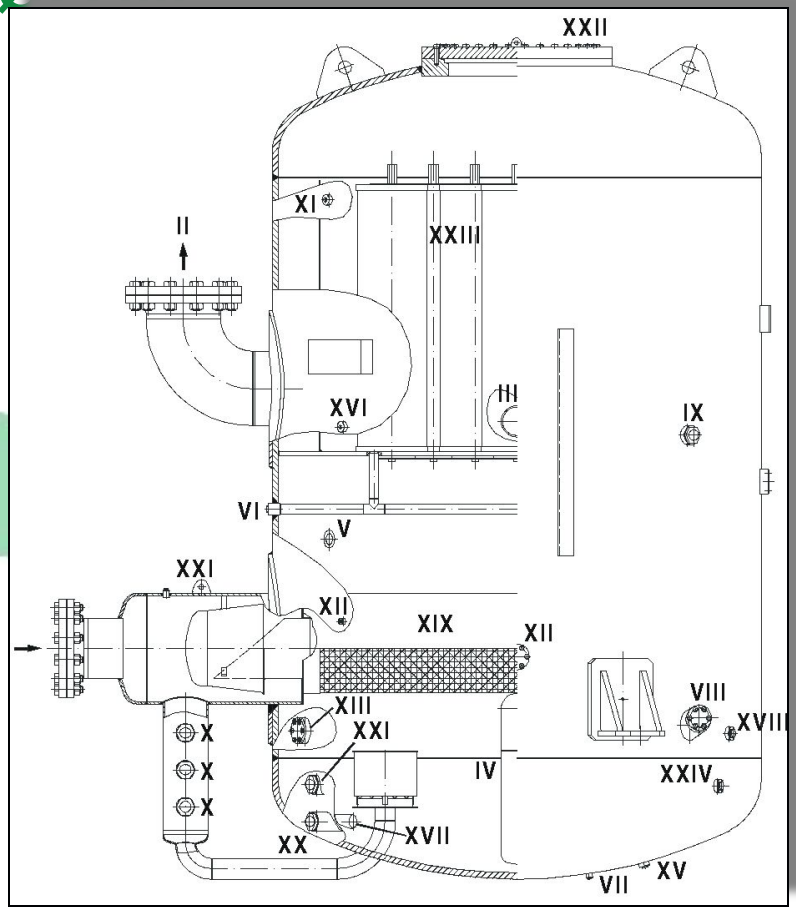
XVIII	Niveauwächter MAX.II	Level controller MAX.II
XIX	Agglomerator	Agglomerator
XX	Feinabscheidepatronen	Fine separation cartridges
XXI	Endtemperatur	Discharge temperature

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



I	Kältemitteleintritt	Refrigerant inlet
II	Kältemittelaustritt	Refrigerant outlet
III	Überströmventil/ Sicherheitsventil	Overflow valve/ Safety valve
IV	Ölaustritt zum Ölkühler	Oil outlet to oil cooler
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VI	Ölrückführung	Oil return
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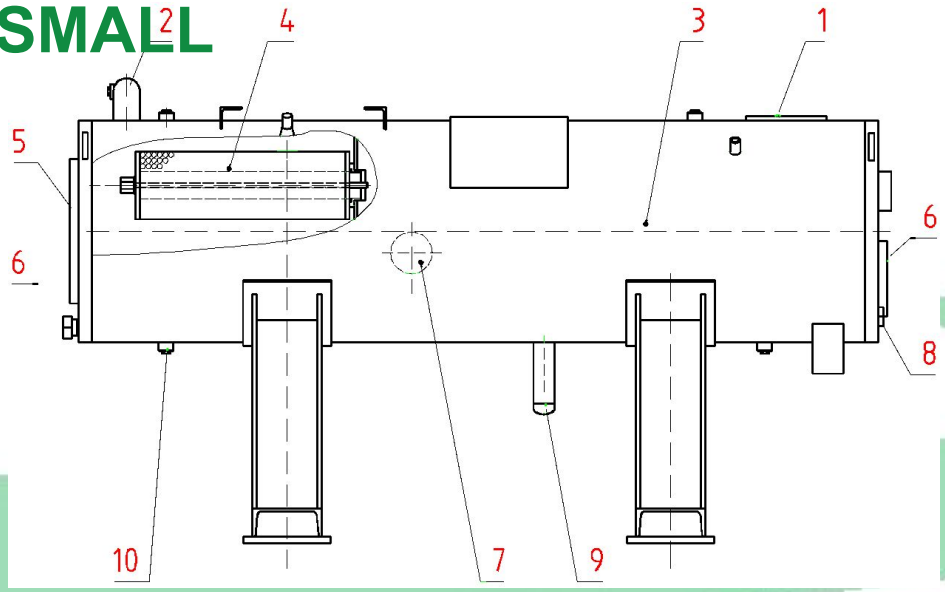
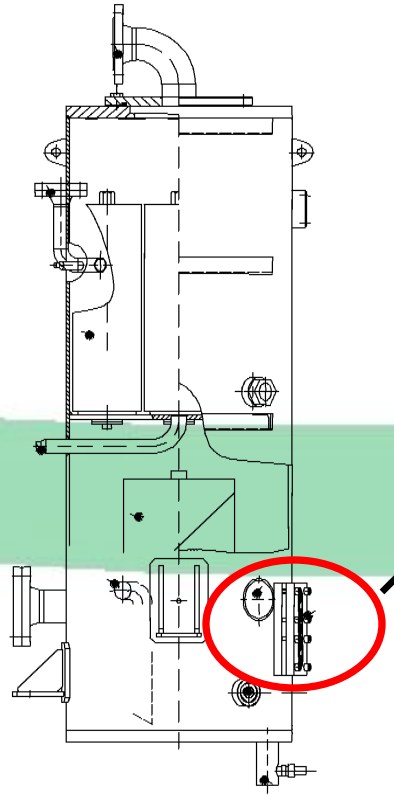
VIII	Ölheizung	Oil heater
IX	Schauglas - Ölfeinabscheidestufe	Sight glass–fine separation stage
X	Schauglas - Ölsammler	Sight glass – oil receiver
XI	Meßleitung/ Umgehungsleitung	Measuring line/ bypass line
XII	Drucktransmitter Enddruck	Pressure transm./disch.pressure
XIII	Niveauwächter MIN.I	Level controller MIN.I
XIV	Anschluß Niveauwächter MAX.I	Connection, level controller MAX.I
XV	Öltemperatur - Ölsammler	Oil temperature – oil receiver
XVI	Sicherheitsdruckbegrenzer	Safety pressure limiter
XVII	Niveauwächter MIN.II	Level controller MIN.II
XVIII	Niveauwächter 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

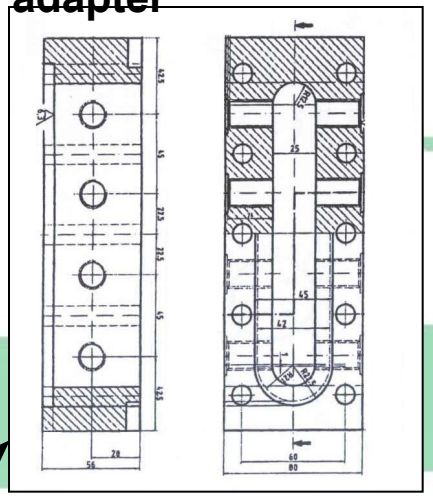


Item	Designation	Bezeichnung	Item	Designation	Bezeichnung
1	refrigerant inlet	Kältemitteleintritt	6	oil level indicator	Ölniveanzeige
2	refrigerant outlet	Kältemittelaustritt	7	level switch connection	Ölniveauschalter-anschluß
3	agglomerator/ demister (not shown in fig.1)	Agglomerator	8	oil heater connection	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 - optoelectronical



Sight glas adapter



senso
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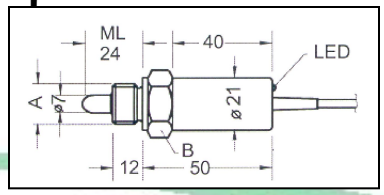
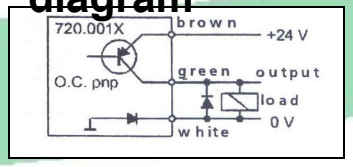
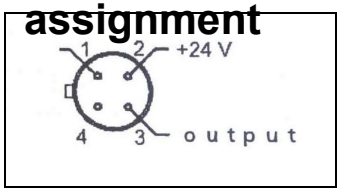


Connection diagram

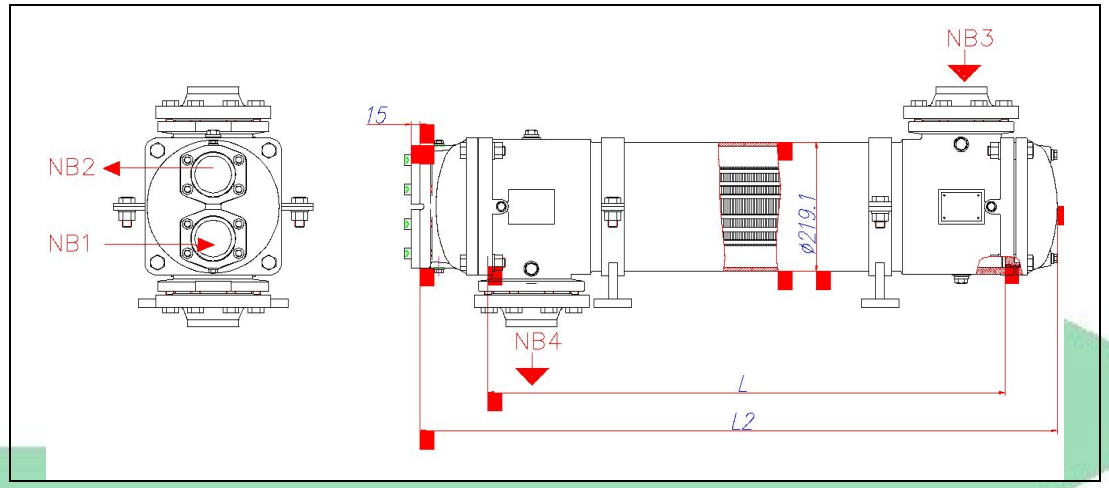


Pin assignment

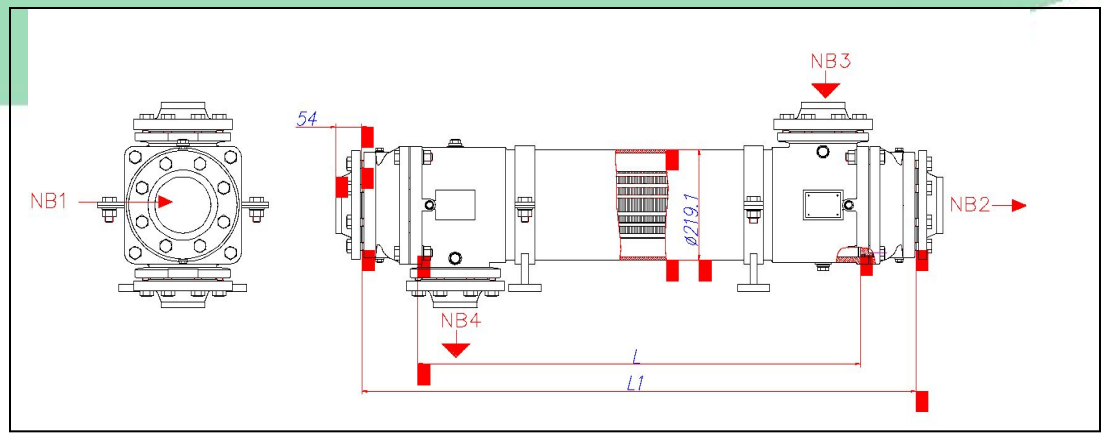


Ölkühler wassergekühlt / oil cooler water cooled

Two Pass Tubeside (KS20):



One Pass Tubeside (KS20):



Baureihenkennzeichnung / Designation code

K S 1 2 - A E P - 8 2 2 L 1000

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

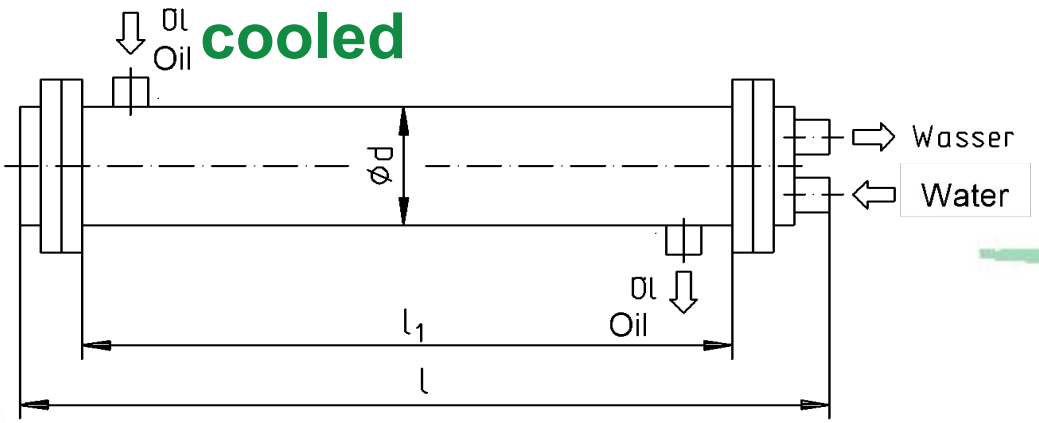
Leistungsdaten / performance data

KS 12		L=400	L=800	L=1200	L=1600	L=2000	L=2600	L=3200	L=3600
exchange area A	m²	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
Water volume flow	m^3/h	4,0	9,2	9,5	3,1	3,4	5,0	7,3	8,5

KS 20		L=400	L=800	L=1200	L=1600	L=2000	L=2600	L=3200	L=3600
exchange area A	m²	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	25	7,9	8,25	13,5	19,7	21,9

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

Ölkühler wassergekühlt / oil cooler water cooled



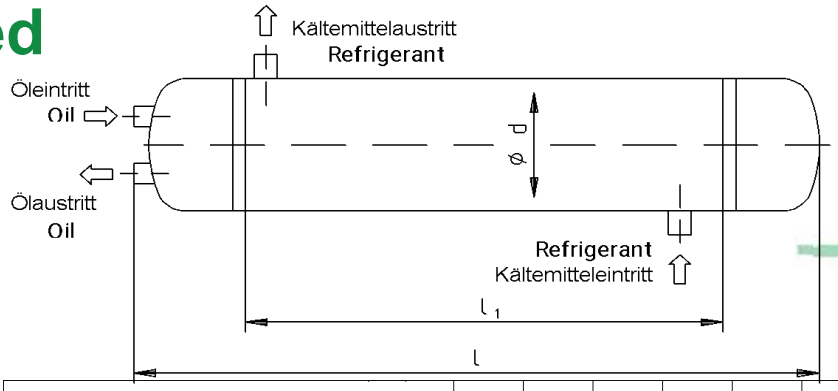
Korrosives Wasser - Rippenrohre
Corrosive water – finned tubes

Typ / Type		H / 1400	H / 2300	L / 2300	J / 1400	M / 2300
Austauschfläche / Exchange area	m²	3,8	6,4	10,7	13,9	23,4
Ölkühlungsleistung / Oil cooling capacity NH_3 (2)	kW	60	70	105	180	250
Ölkühlungsleistung / Oil cooling capacity NH_3 (1)	kW	35	60	100	140	240
max. zul. Wasserdurchsatz / max. water flow	m³/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

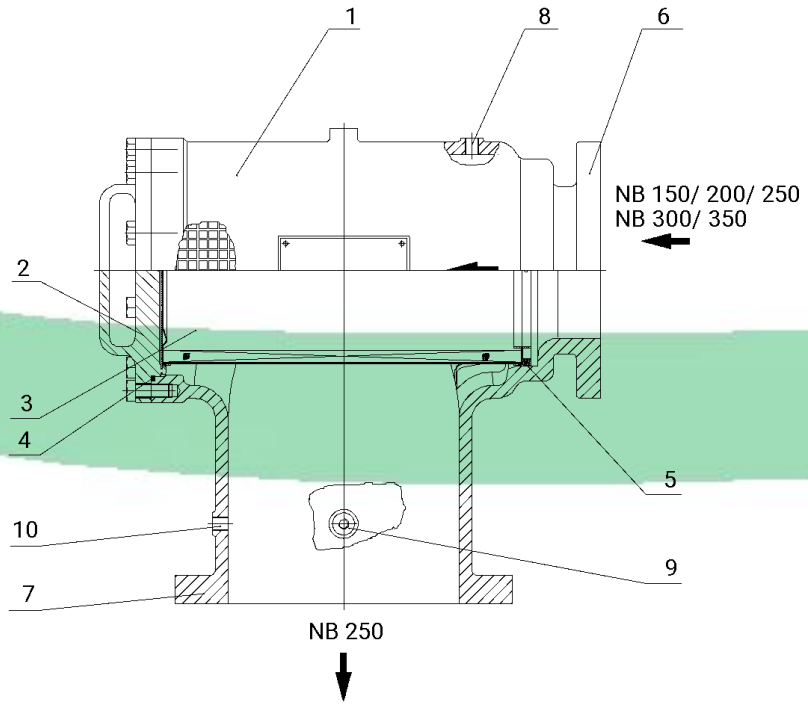
Typ / Type			150-1000	200-1500	200-2000	250-2000	300-1500	350-1500	350-2000	400-2000	450-2000	500-2000	550-2000	550-2500
Fläche / Exchange area		m²	1,1	3,9	5,2	9,9	11,3	14,8	19,7	25,3	34	44,6	54,7	68,4
Ölkühlleistung / Oil cooling capacity	2)	kW	10	35	70	115	160	215	270	350	500	600	750	-
Ölkühlleistung / 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

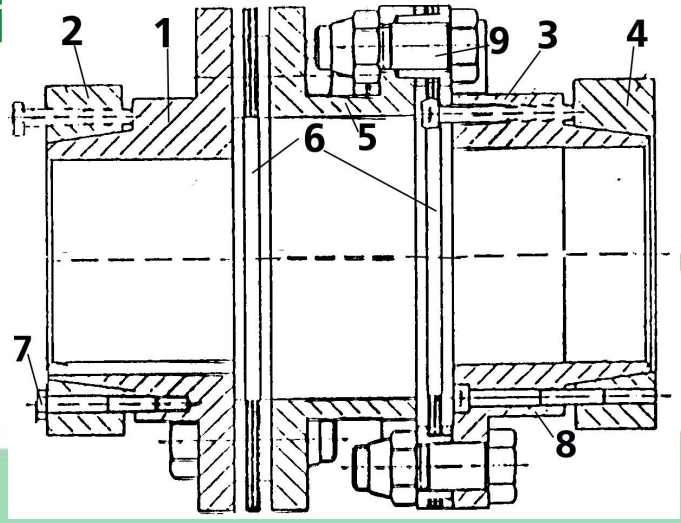
1) Condensing temperature/ max. +40°C oil inlet / Öleintritt 80°C oil outlet / Ölaustritt 50°C

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	Kältemitteleintritt
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



Motor side

Compressor side

Pos. – Nr. / Pos.-No.	Description	Bezeichnung
1	Motorseitige Nabe	Drive side hub
2	Motorseitiger Spannring	Drive side clamping ring
3	Verdichterseitige Nabe	Compressor side hub
4	Verdichterseitiger Spannring	Compressor side clamping 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:

Anzugsmomente für Spannsatzschrauben / Tightening torque for tapered bush screws						
	Verdichterseite / Compressor side			Motorseite / Drive side		
Kupplungsgröße Coupling Size	Wellendurchmesser Shaft diameter	Gewinde Screw Size	Tan [Nm]	Wellendurchmesser Shaft diameter	Gewinde Screw Size	Tan [Nm]
66 E60	40	M8	30	55	M6	12
E70	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
	80	M8	30	70	M8	30
				75	M6	14
				80	M8	30
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						

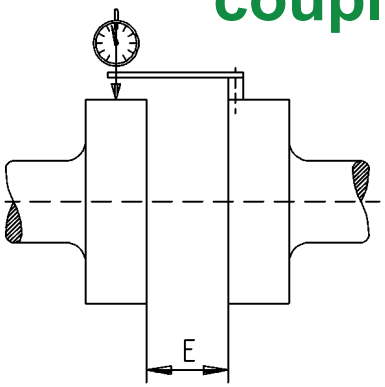
Anzugsmoment für Lamellenpakete:

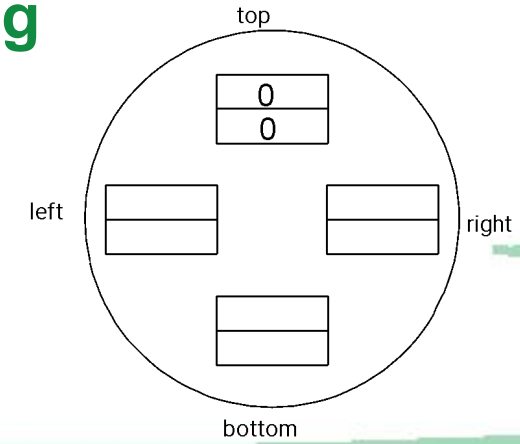
Tightening torques for lamination package:

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

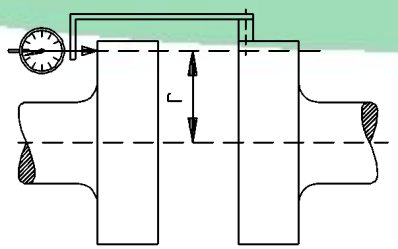
Kupplung / Steel lamination coupling

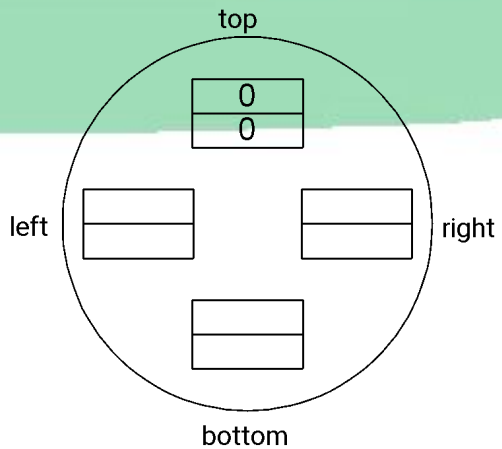




Radial misalignment

Versatz



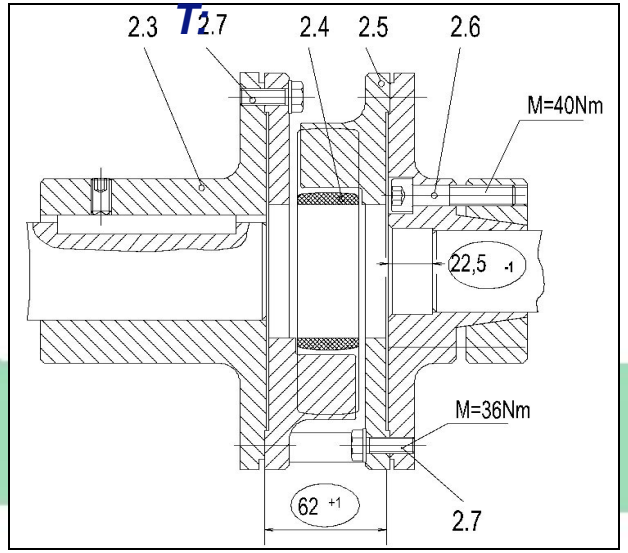


Angular misalignment

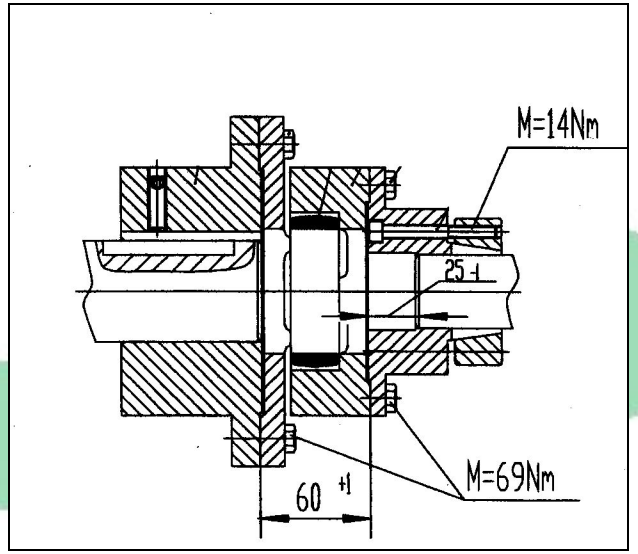
Klaffung

Kupplung / coupling SMALL

design



design

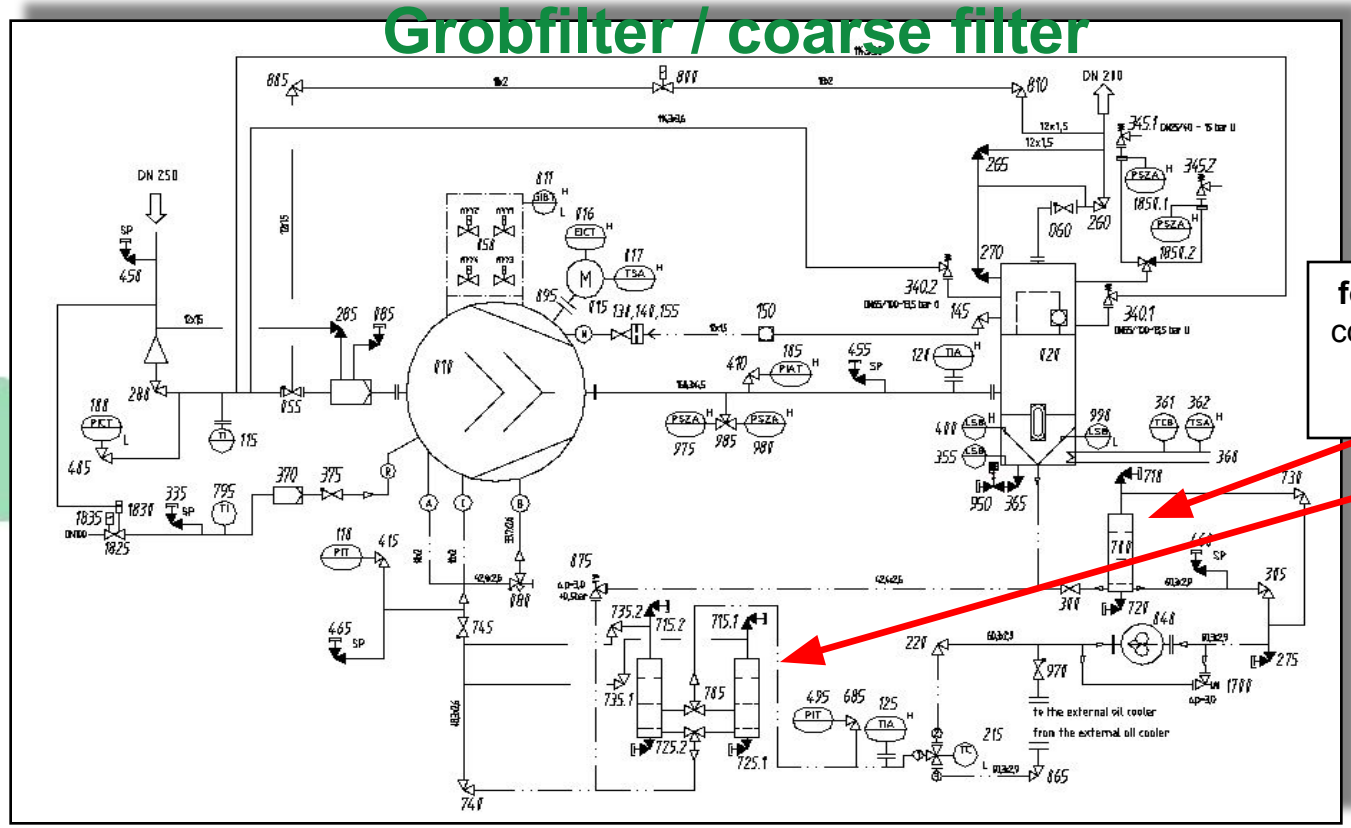


Abbau des Kupplungsschutzes (2.2) am Kupplungsgehäuse. Ölrohr (5.4) aus dem Deckel der Gleitringdichtung herausdrehen. Sechskantschrauben (2.7)aus motor- und verdichterseitiger Kupplungsnabe herausschrauben. Kupplungsmittelteil (2.5) zusammendrücken, so daß die Zentrieransätze aus den Naben rutschen. 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.

Option –oil filter P+I

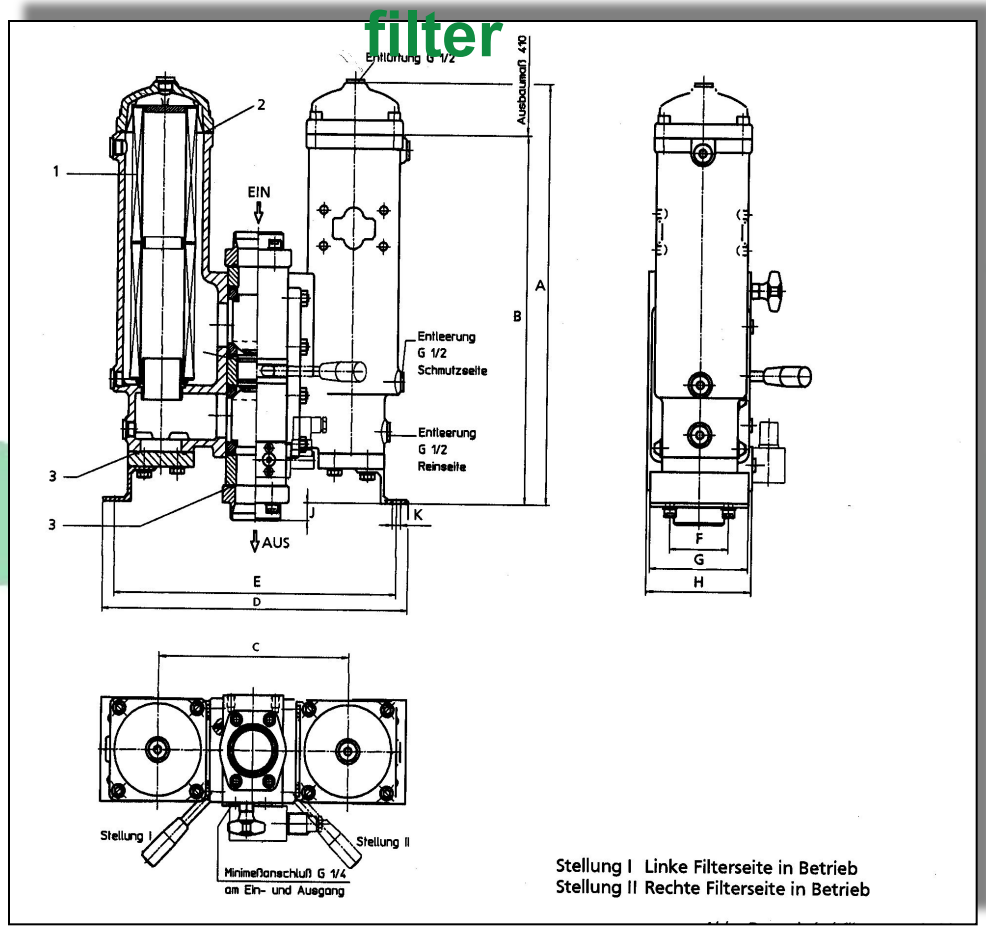
Doppelölfilter / Double oil filter
Grobfilter / coarse filter

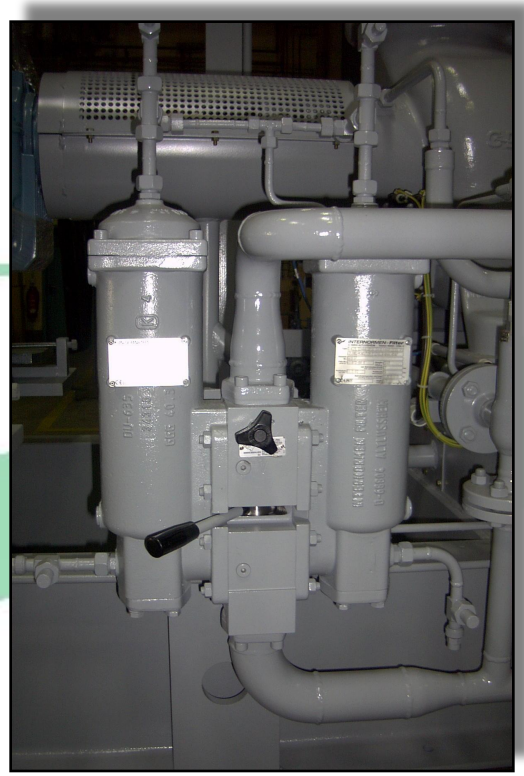


for NEW refrigerants:
coarse filter (e.g. 40µm)
fine filter (e.g. 25µm)

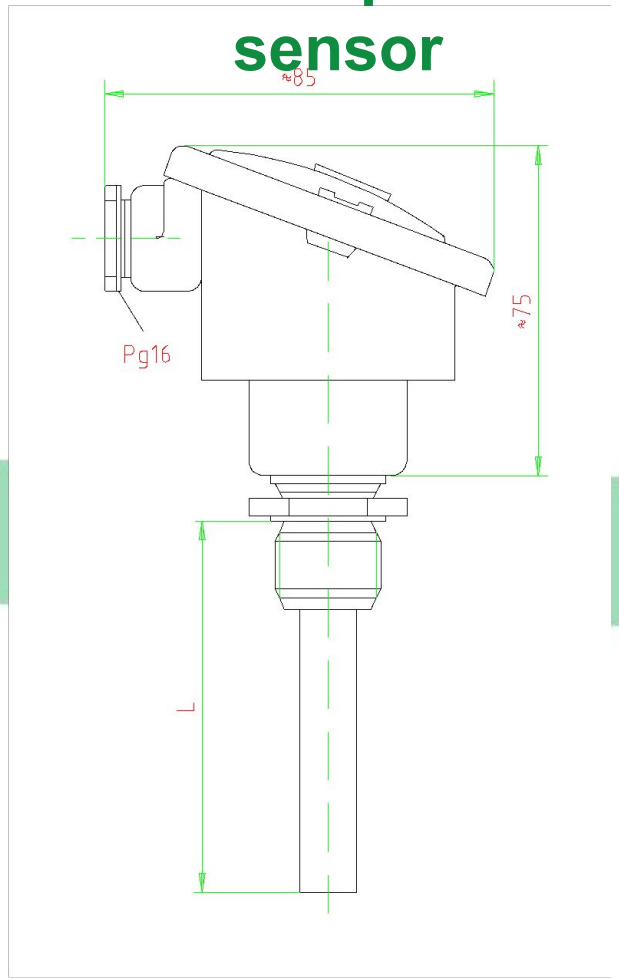
Option – double oil filter

Doppelschaltfilter / double oil filter



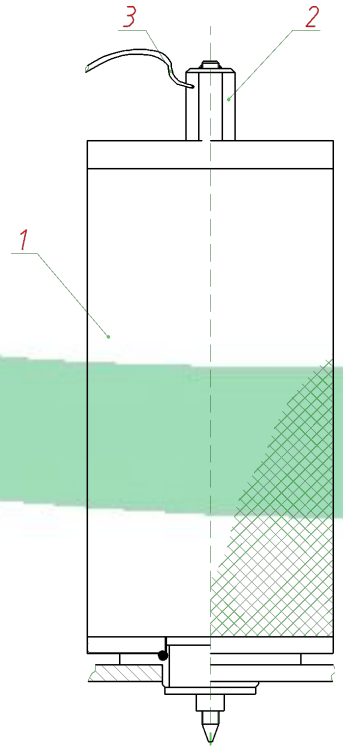


Temperatursensor / temperature sensor



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



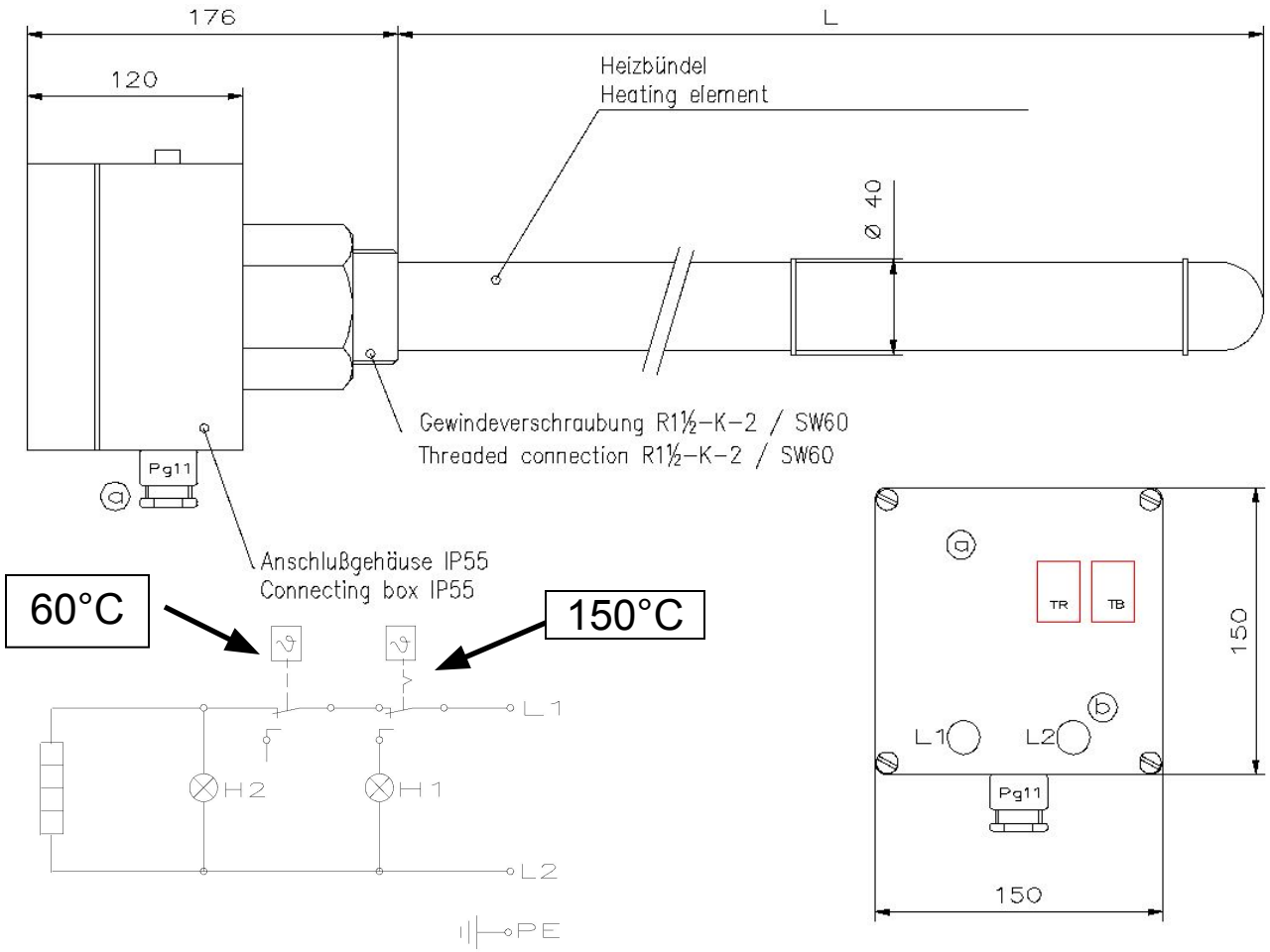
REPLACEMENT OF THE OIL SEPARATION CARTRIDGES

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.

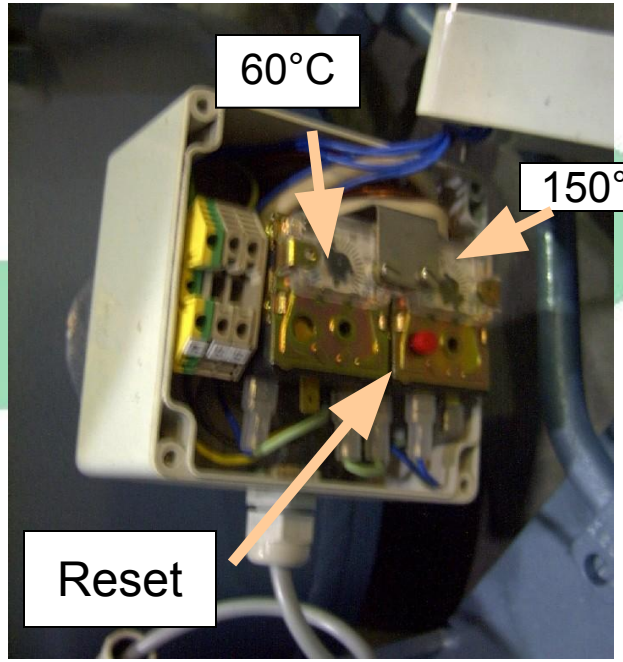
AUSTAUSCH DER FEINABSCHEIDEPATRONEN

1. Schließen der Absperrventile auf der Saug- und Druckseite.
2. Entfernen des Kältemittels und Ablassen des Drucks.
3. Kontrolle des Aggregatedrucks.
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.

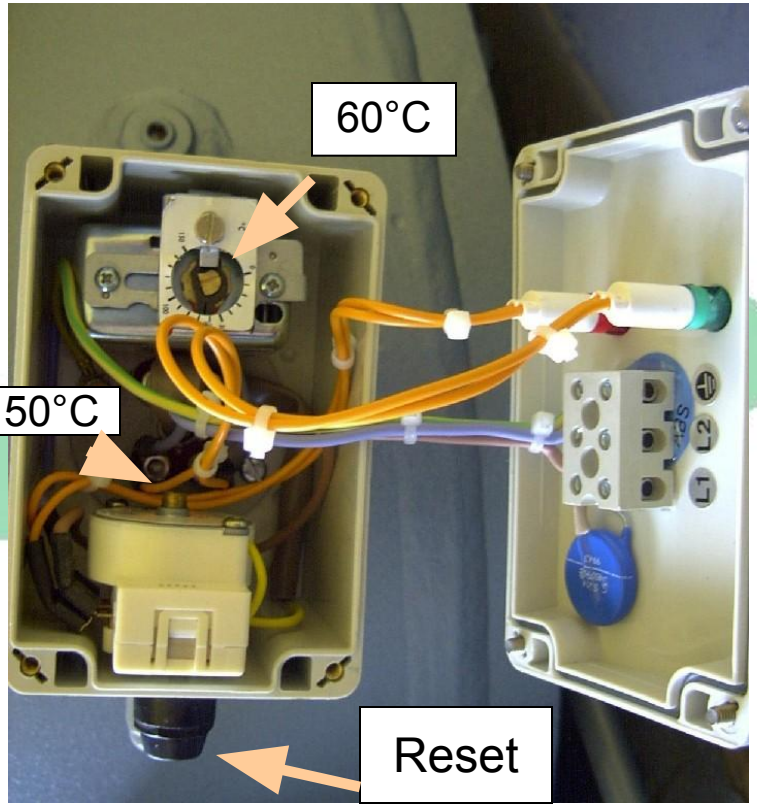
Ölheizung / oil heater



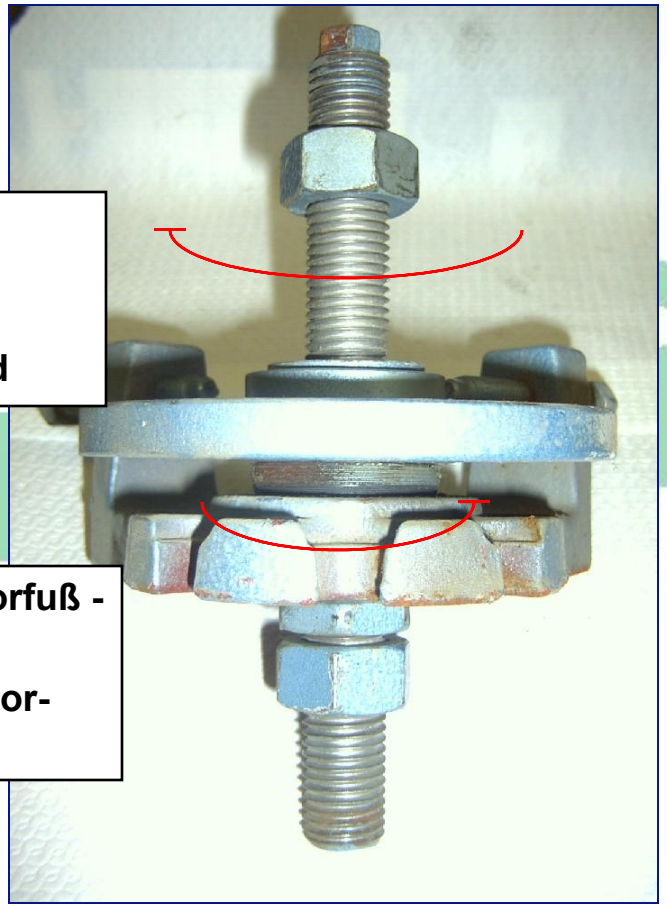
Ölheizung / oil heater



Ölheizung / oil heater - HELIOS



Motorfixatoren - Fixator



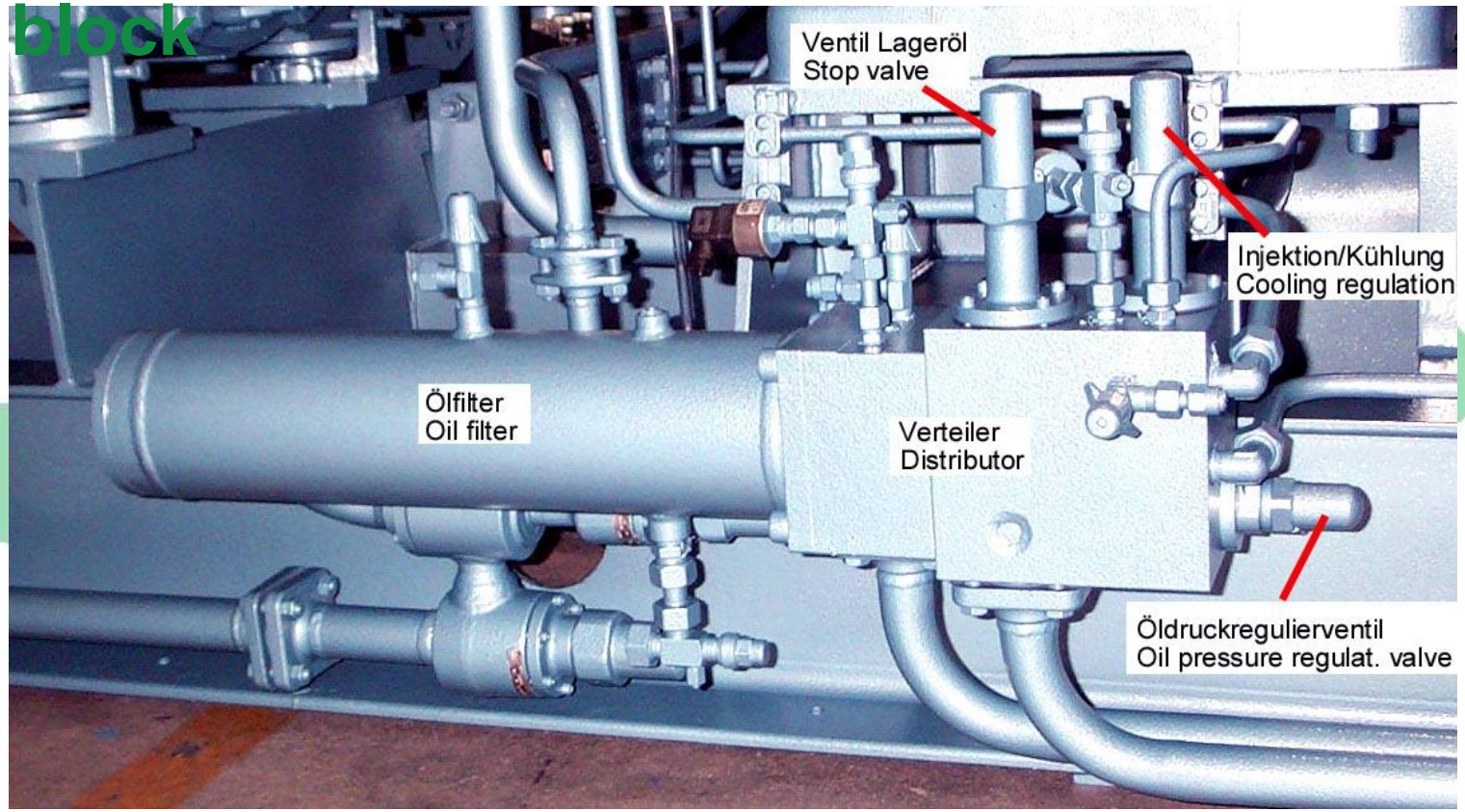
Fixierung Motorfuß - Linksgewinde

Fixation motor- Anti-clockwise threaded

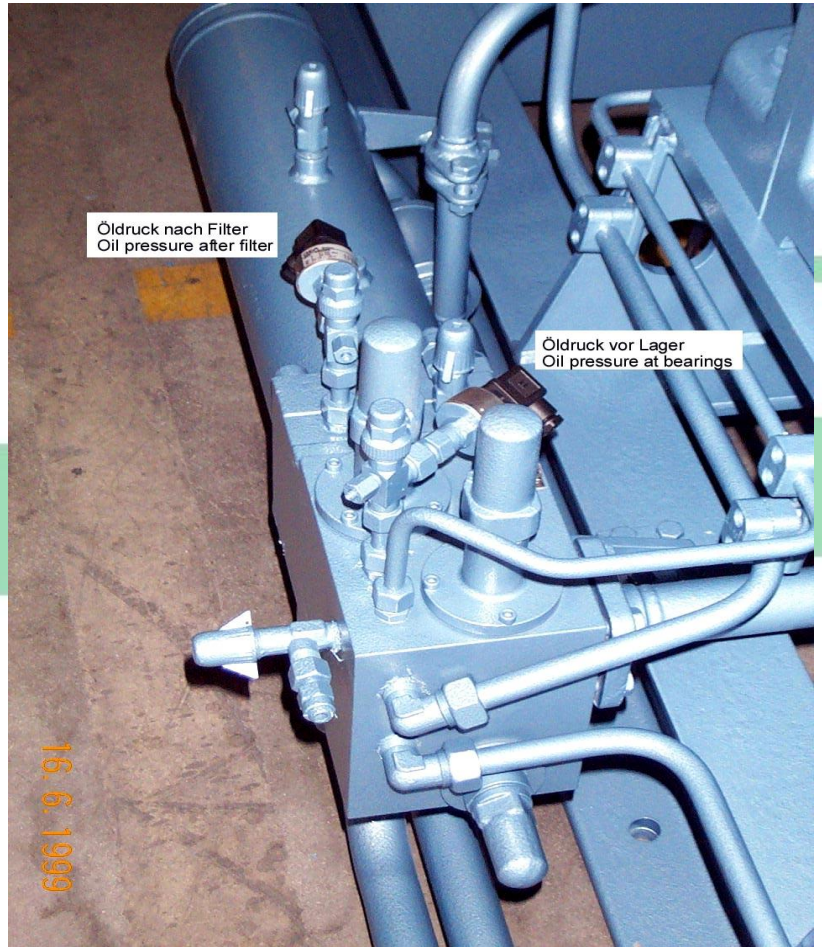
Höheneinstellung Motorfuß - Rechtsgewinde

Height adjustment motor- clockwise threaded

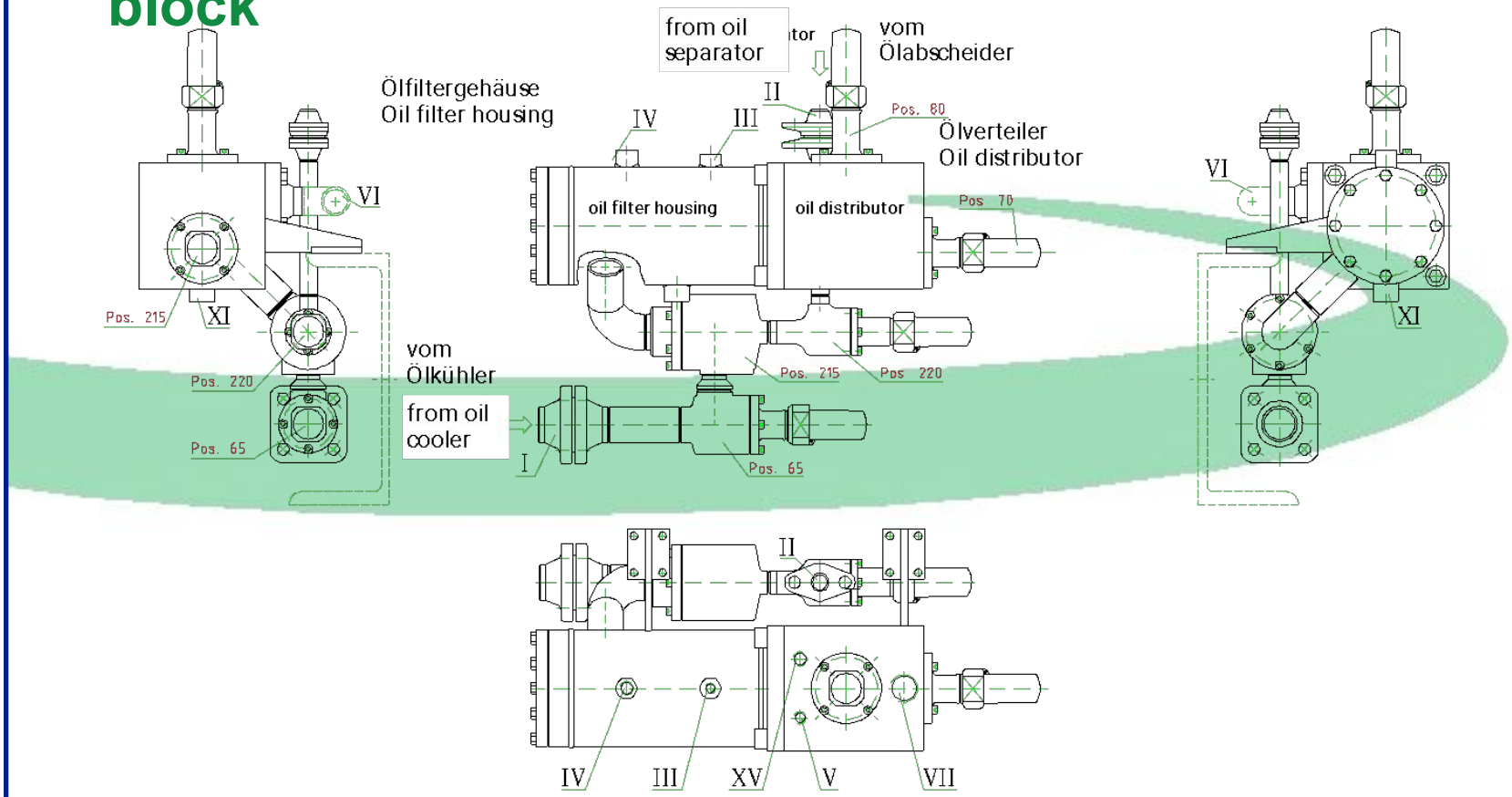
Ölmanagementblock/Multifunctional block



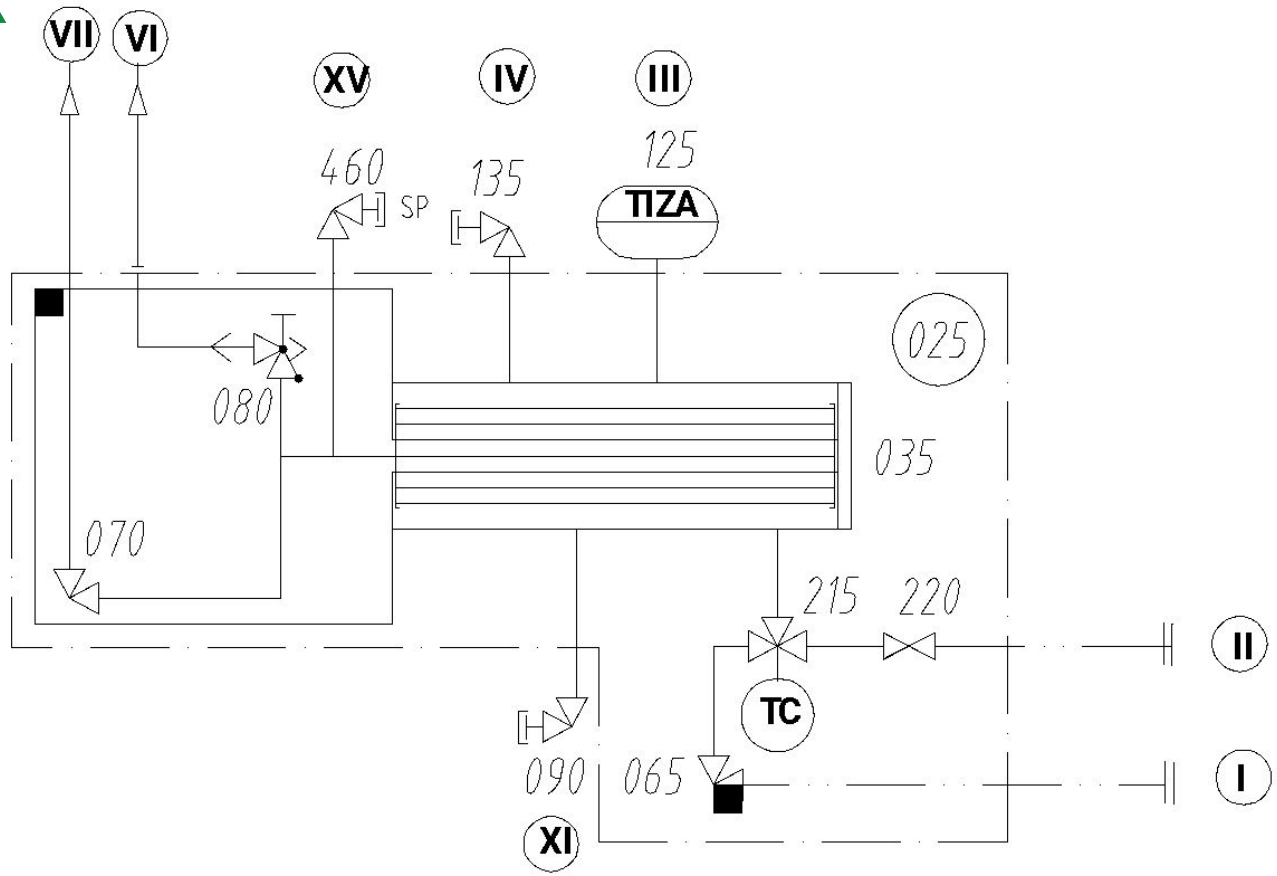
Ölmanagementblock/Multifunctional block



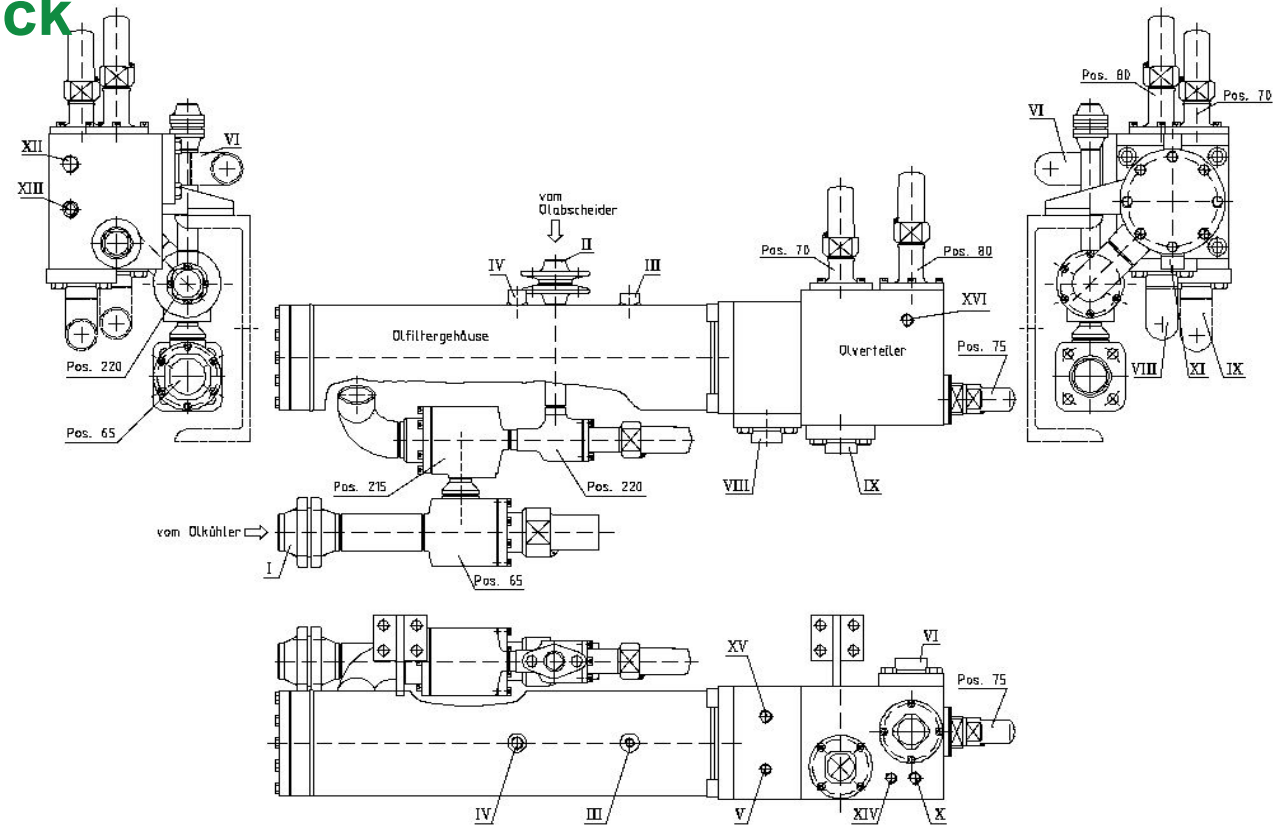
MEDIUM - Ölmanagementblock/Multifunctional block



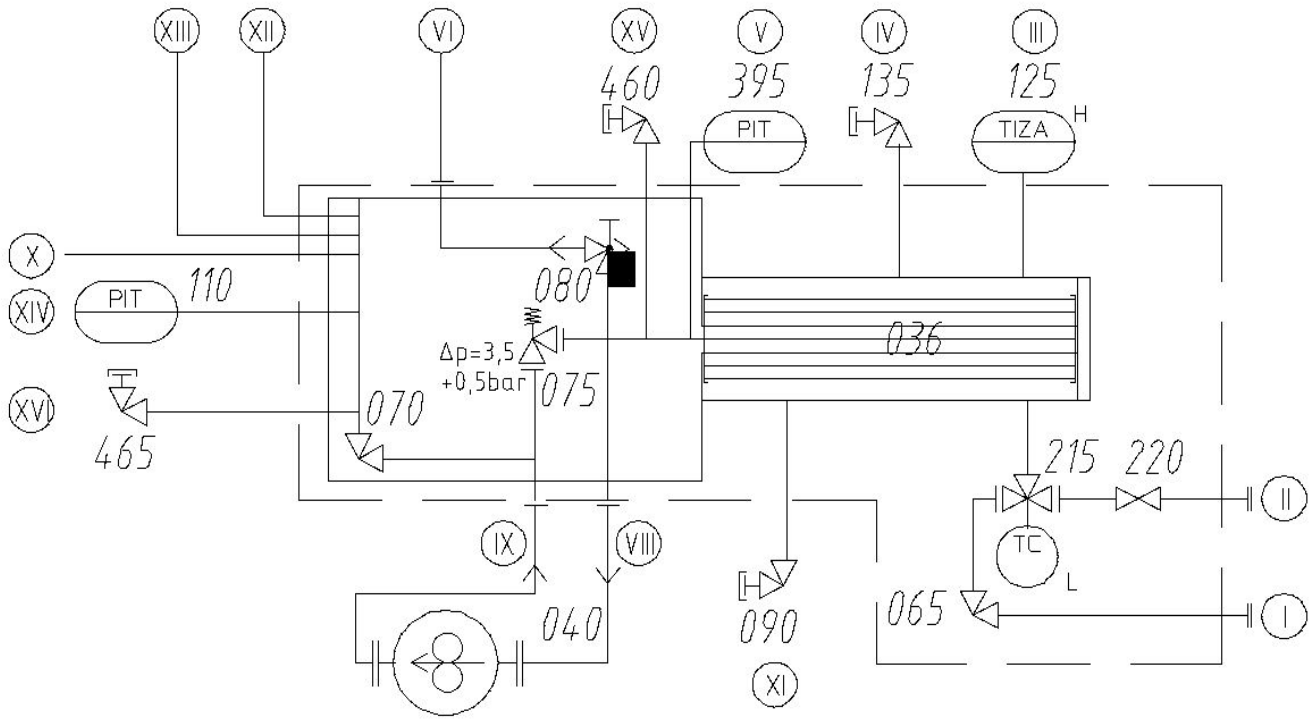
MEDIUM - Ölmanagementblock/Multifunctional block



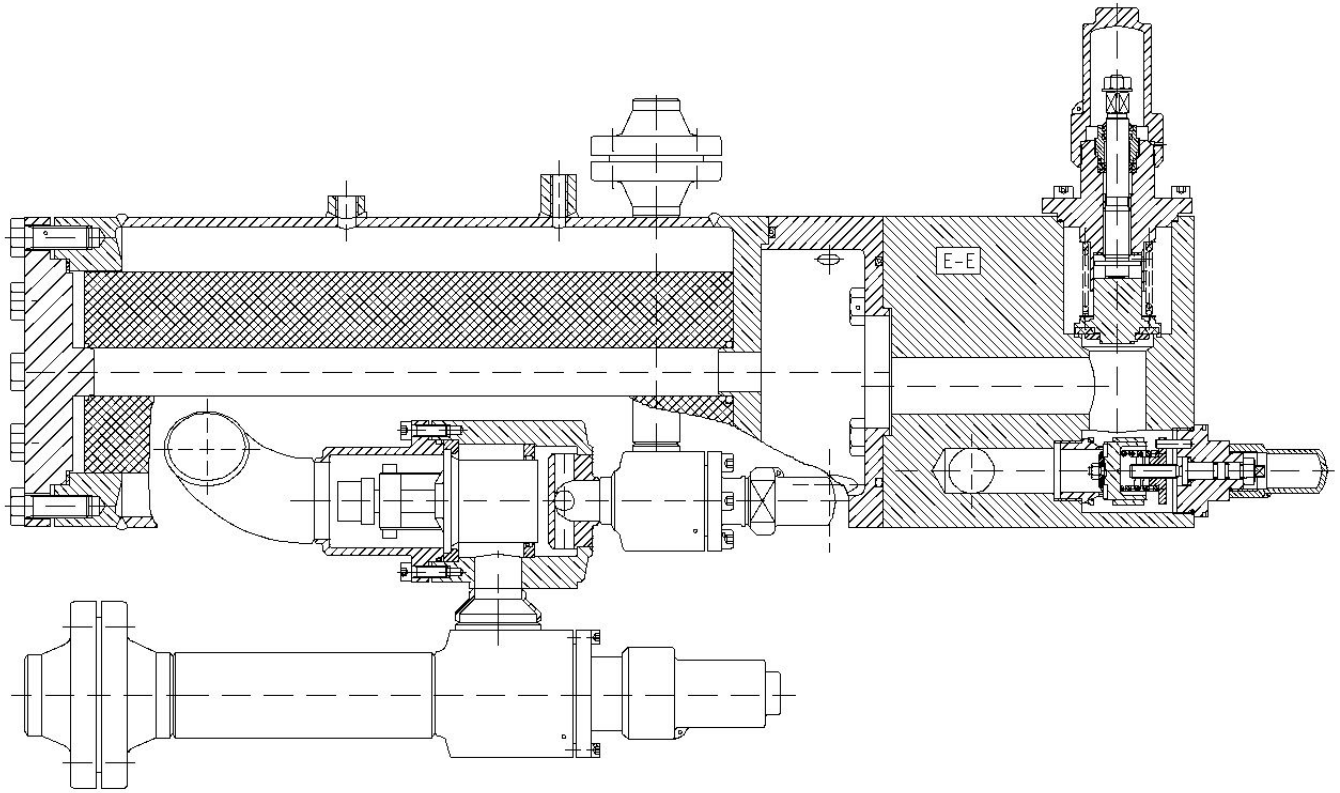
LARGE - Ölmanagementblock/Multifunctional block



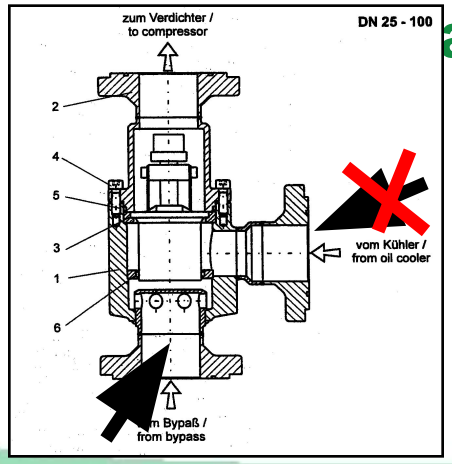
LARGE - Ölmanagementblock/Multifunctional block



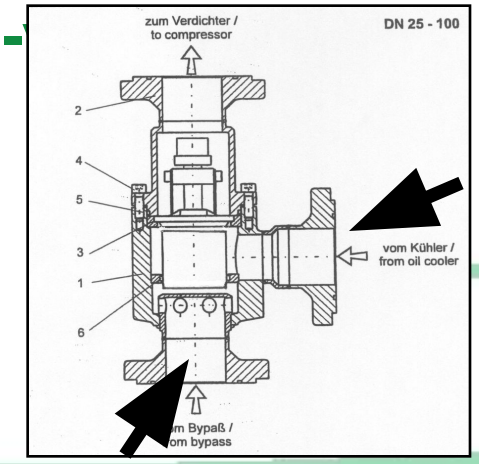
LARGE - Ölmanagementblock/Multifunctional bl



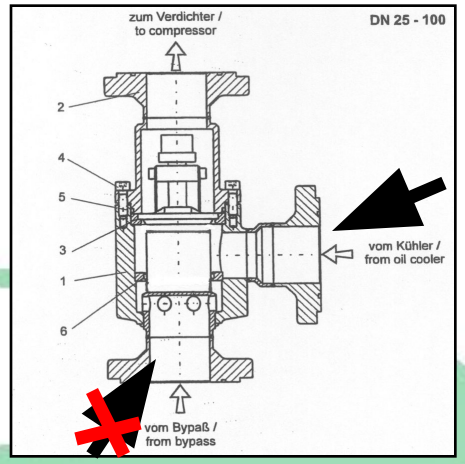
3-Wege-Ventil /
ay-



start condition cold oil

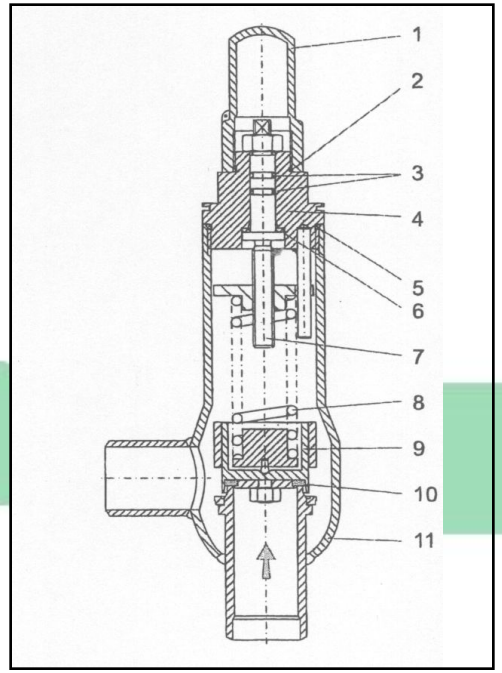


operation condition correct oil temperature



Increased oil temperature

Öldruckregulierventil / oil pressure regulating valve



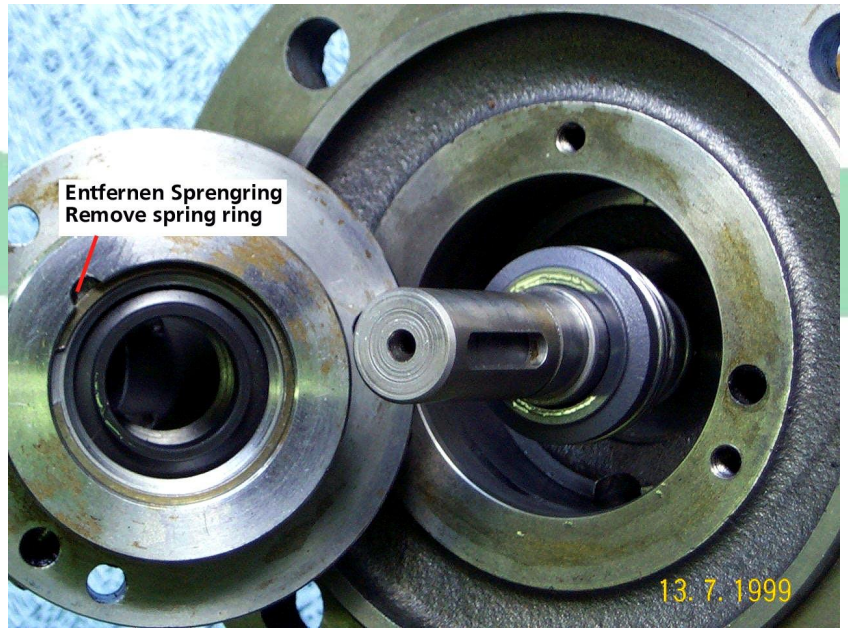
POS 5: O-Ring 50x3

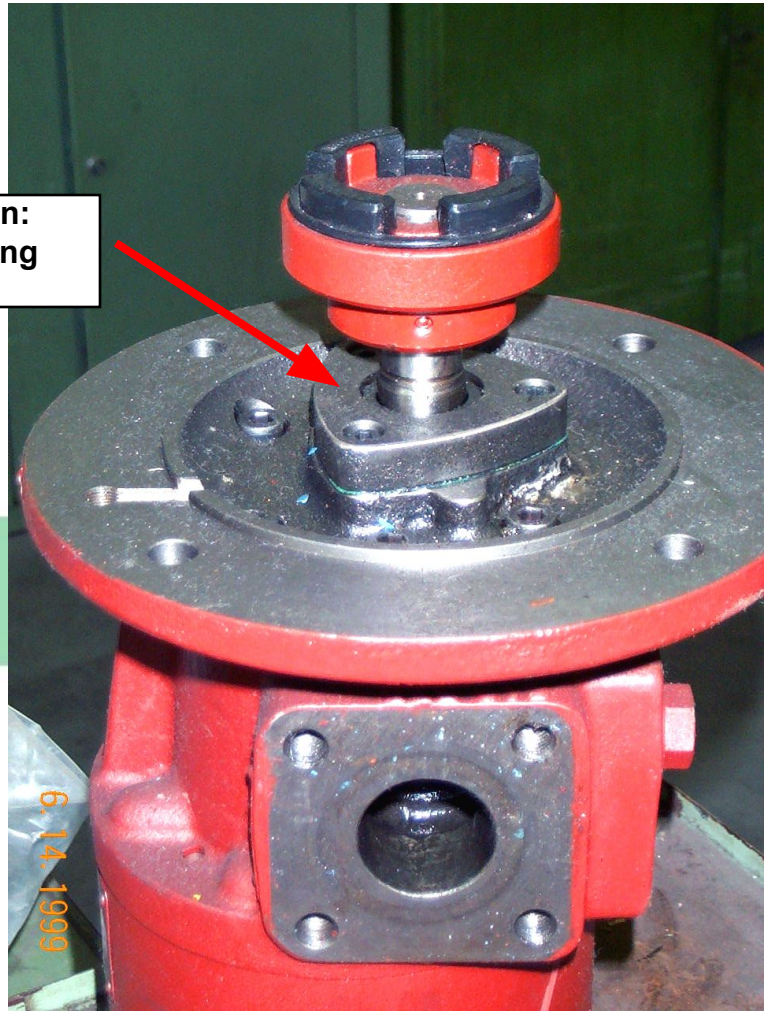
Valve piston (Old design)

Valve piston (NEW design) Since ~10/2002

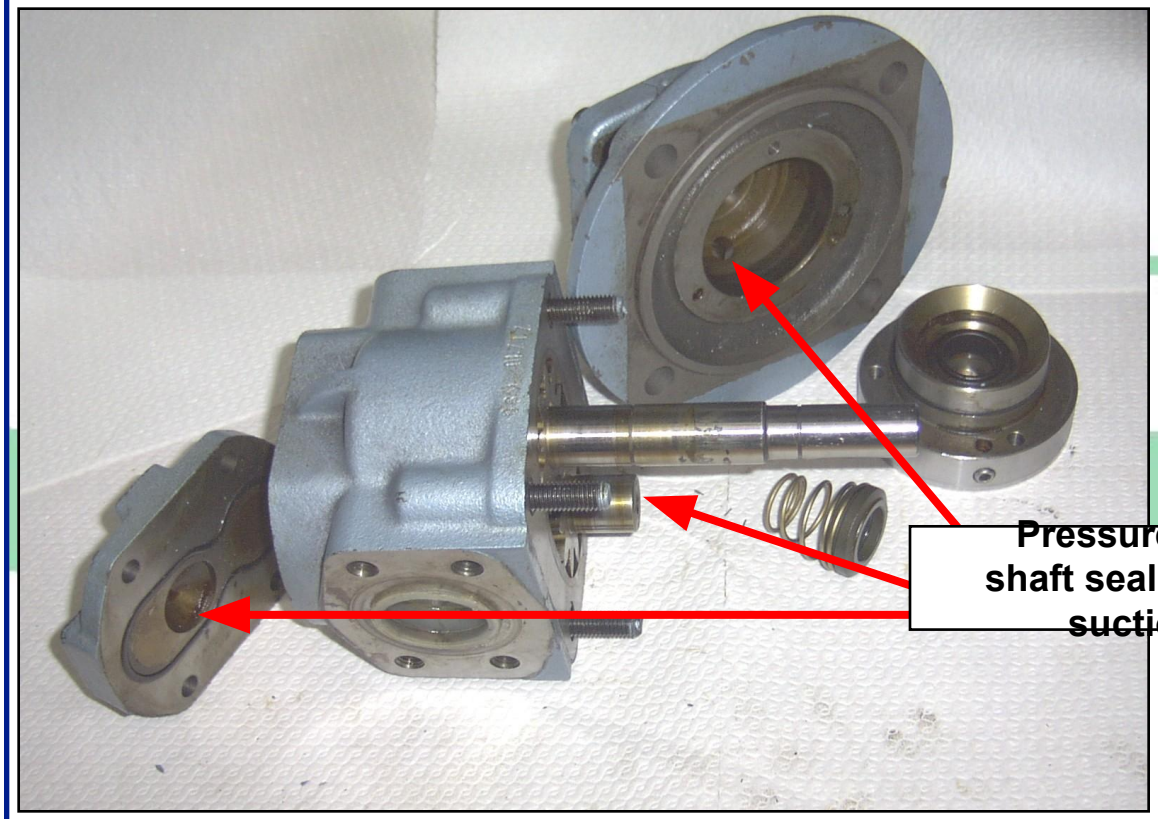
Valve piston seat

Ölpumpe / oil pump





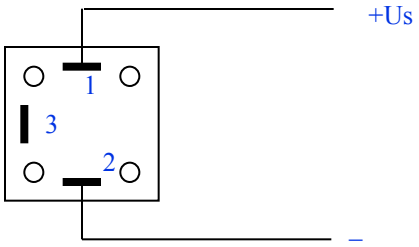
Ölpumpe / oil



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

Drucksensor / Pressure sensor

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



Standard pressure range:

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