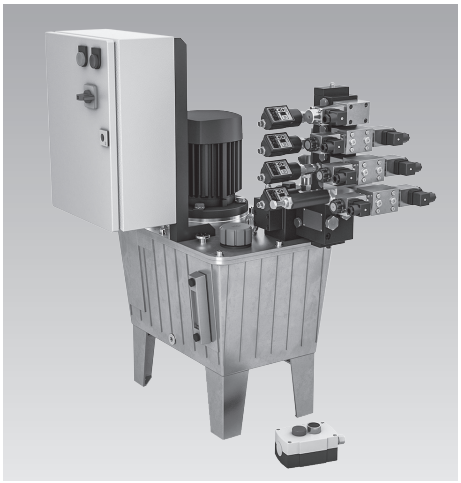
Power Units in Modular Design

Operating pressure 30 to 500 bar, flow rate 0.9 to 12 l/min reservoir sizes 11 l, 27 l, 40 l, 63 l



Application

For the operation of hydraulic clamping fixtures and other handling and clamping systems on machine tools.

Description

The power units of this series consist of individual modules that are selected depending on the application and are assembled on the basis of a type code to a power unit ready for use.

Modules

- Power unit (reservoir, pump, motor)
- Connecting block basic functions
- Valve block with up to 4 control circuits
- Electronics

Characteristics

- for single and double acting cylinders
- continuously adjustable operating pressure
- expandable to up to 8 pressure circuits
- constant flow rate
- wide range of valves
- wide range of hydraulic functions
- energy-saving mode S3 (intermittent mode) or S6 (unpressurised cycle)
- supplied ready for connection

Equipment - Standard

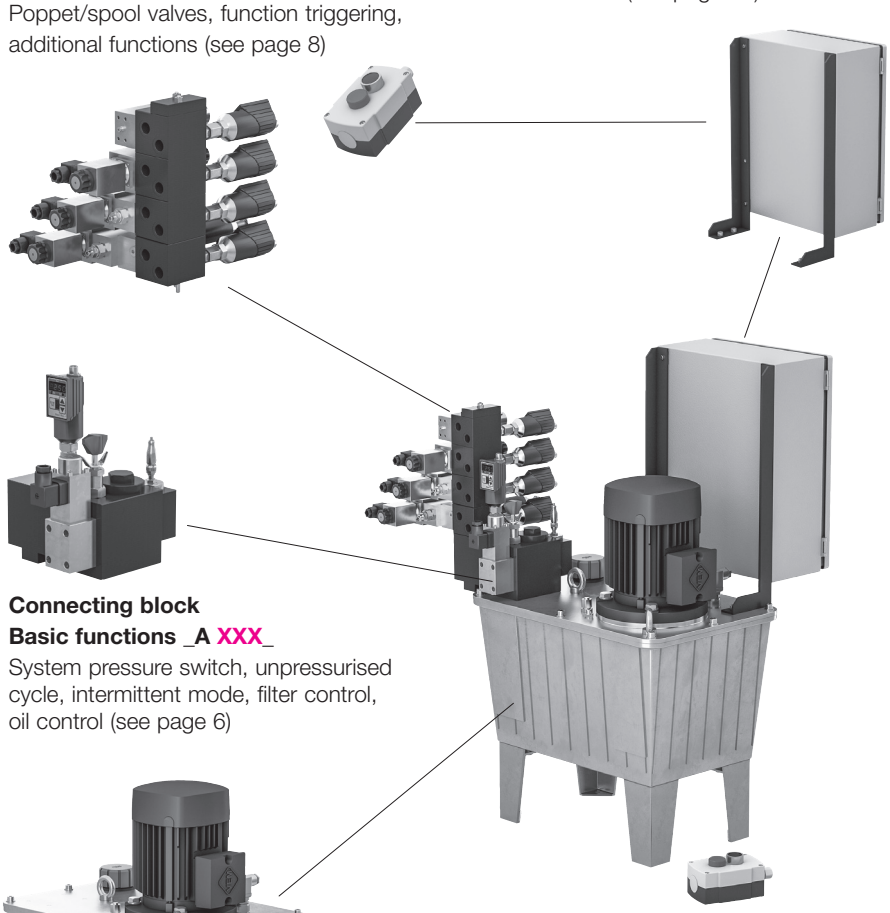
- connecting block with pressure relief valve
- pressure filter 10 µm
- oil level gauge
- oil temperature gauge
- design without piping

Equipment - Options

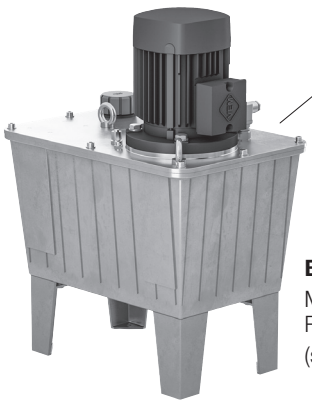
- electronic system pressure switch with simplified pressure adjustment by teach-in function
- pressure switch for machine tool interlock mechanically or electronically
- electrical oil level control
- electrical temperature control
- return filter
- electrical filter control
- electric control
- terminal box
- foot switch or manual switch
- key-operated switch

Valve block
Control circuit _V1 XX X XXX SX_ ..._V4
Poppet/spool valves, function triggering, additional functions (see page 8)

Electronics _E X
Electric control, terminal box, (see page 11)



Connecting block
Basic functions _A XXX_
System pressure switch, unpressurised cycle, intermittent mode, filter control, oil control (see page 6)



Basic power unit PM XX
Motor rating 0.75 – 3.0 kW
Reservoir sizes 11, 27, 40, 63 litres
(see page 4)

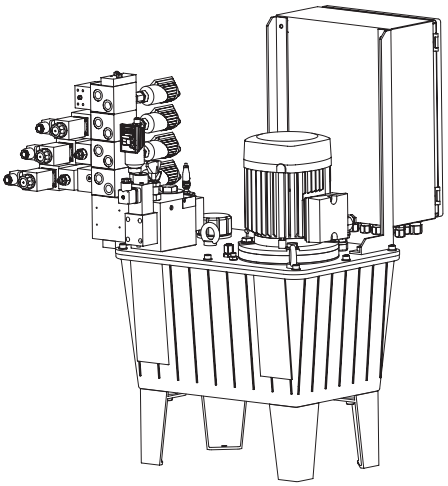
Performance data

p max. [bar]	Q [l/min]	Reservoir [l]
120	12	27 40 63
160	8.8	27 40 63
160	12	40 63
200	1.5	11 27 40 63
200	3.3	11 27 40 63
200	4.5	11 27 40 63
200	6.2	27 40 63
200	8.8	40 63
350	3.6	27 40 63
350	5.3	40 63
400	2.5	11 27 40 63
450	4.2	40 63
500	0.9	11 27 40 63
500	1.5	11 27 40 63
500	2.6	27 40 63
500	3.7	40 63
500	0.7/5.2	11 27 40 63
500	0.7/8.8	11

Further pump variants and equipments are available on request.

Type code: PMXX_AXXX_V1-XX X XXX SX_V2-XX X XXX SX_V3-XX X XXX SX_V4-XX X XXX SX_EX

- PMXX_AXXX: Basic power unit
- V1-XX X XXX SX: Basic functions
- V2-XX X XXX SX: Control circuit 1 / Switch variant
- V3-XX X XXX SX: Control circuit 2 / Switch variant
- V4-XX X XXX SX: Control circuit 3 / Switch variant
- EX: Control circuit 4 / Switch variant / Electronics



Modular design

By the use of pre-assembled modules, module power units can be flexibly implemented in the short term and in a cost-effective way.
The modular design and numerous design options allow a flexible adaptation to the respective application.

Module power units are particularly suitable as a base to build complex hydraulic controls. A linkable basic block offers the user the possibility to expand the power unit with different function and control elements for the specific application.

Determination of the type code

A type code that results from the used modules is available for the different module components and results in the final part number for the power unit.
To select the correct arrangement, size and performance of the individual components, you will find all parameters and their type code on the following pages.

Safety features

- Precisely defined clamping force by continuously adjustable operating pressure
- Electronic system pressure switch with digital pressure display (option)
- Repeatability ± 1 bar
- Renewed oil supply after a pressure drop of max. 10 %
- Machine tool interlock (option) at a pressure drop of max. 20 %, is automatically updated in case of pressure adjustment
- Oil level and temperature control (option)
- Precise oil temperature display by stick thermometer
- Pressure filter 10 µm in the connecting block
- Screen disks in the ports
- Control voltage 24 V DC
- Pressure maintenance in case of power failure due to hermetically sealed poppet valves
- Overpressure protection of the individual pressure circuits (option)

Important notes:

These power units are exclusively designed for the industrial use of pressure generators for hydraulic fixtures.
All connected hydraulic components must be leakage-free and designed for the maximum operating pressure of the power unit.
The power unit generates very high pressures. The connected cylinders generate very high forces so that there is a permanent danger of crushing in the effective area of the piston rod. The manufacturer of the fixture or the machine is obliged to provide effective protection devices.
Installation, start up and maintenance have to be made according to the operating manual by authorised experts.

Technical data

Designs	
• Gear pump	max. 200 bar
• Piston pump	max. 500 bar
• Pump combination	max. 80 / 500 bar
Type of mounting	foot mounting
Port size	G 1/4, G 3/8 and G 1/2
Direction of rotation (view from above onto the drive shaft)	
• Gear pump	clockwise rotation
• Piston pump	any
• Pump combination	counterclockwise rotation
Mounting position	upright
Usable oil volume	50 % of reservoir volume
Vol. efficiency	η vol = 85–95 %

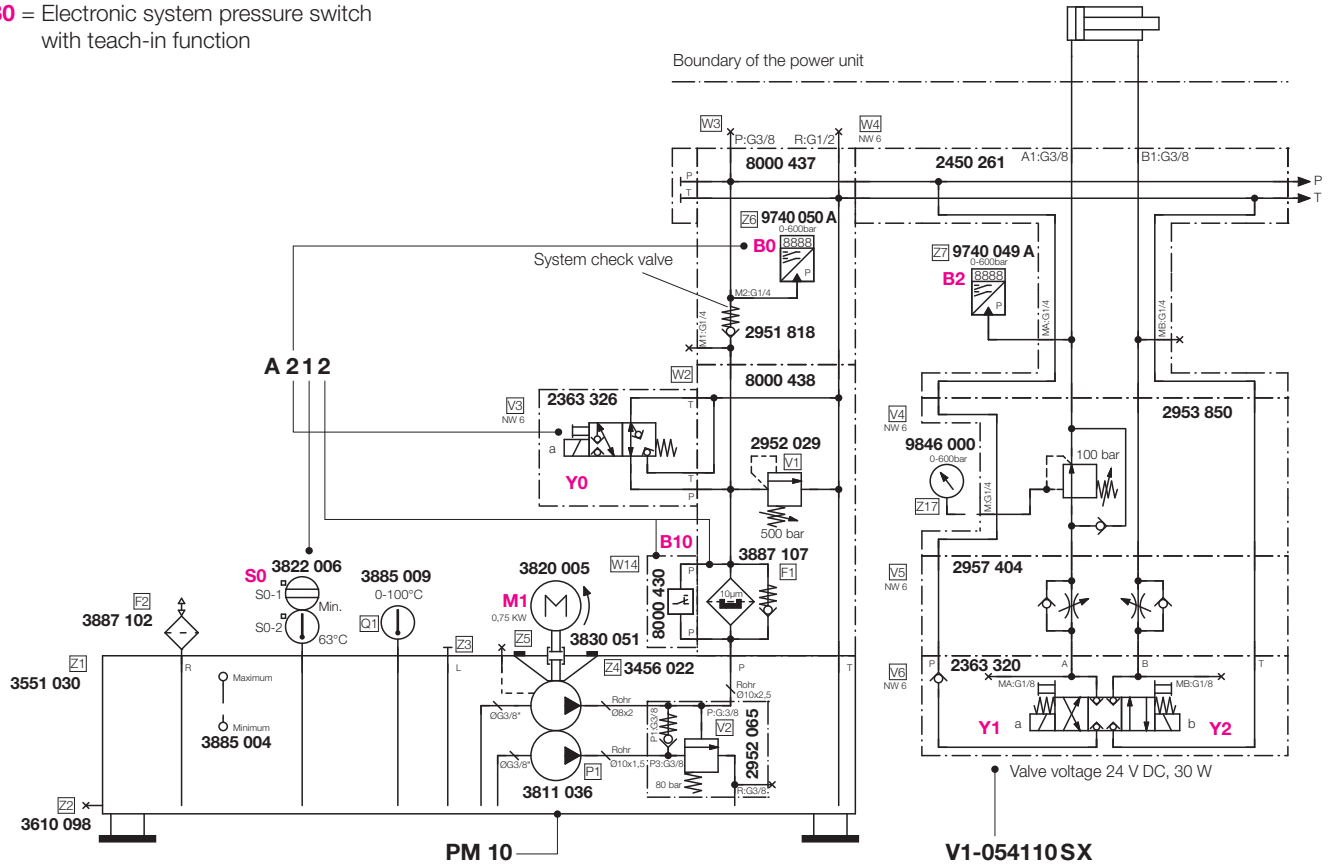
Electrical characteristics - Motor

Nominal voltage*	400 V up to 2.2 kW star connection 400 V from 3 kW delta connection
Type	squirrel cage rotor, 4-pole
Voltage type*	three-phase AC voltage, 50 Hz
Code class	IP 55
Max. relative cycle time	depending on the operating pressure specifications for 100 % or 40 % ED see page 4

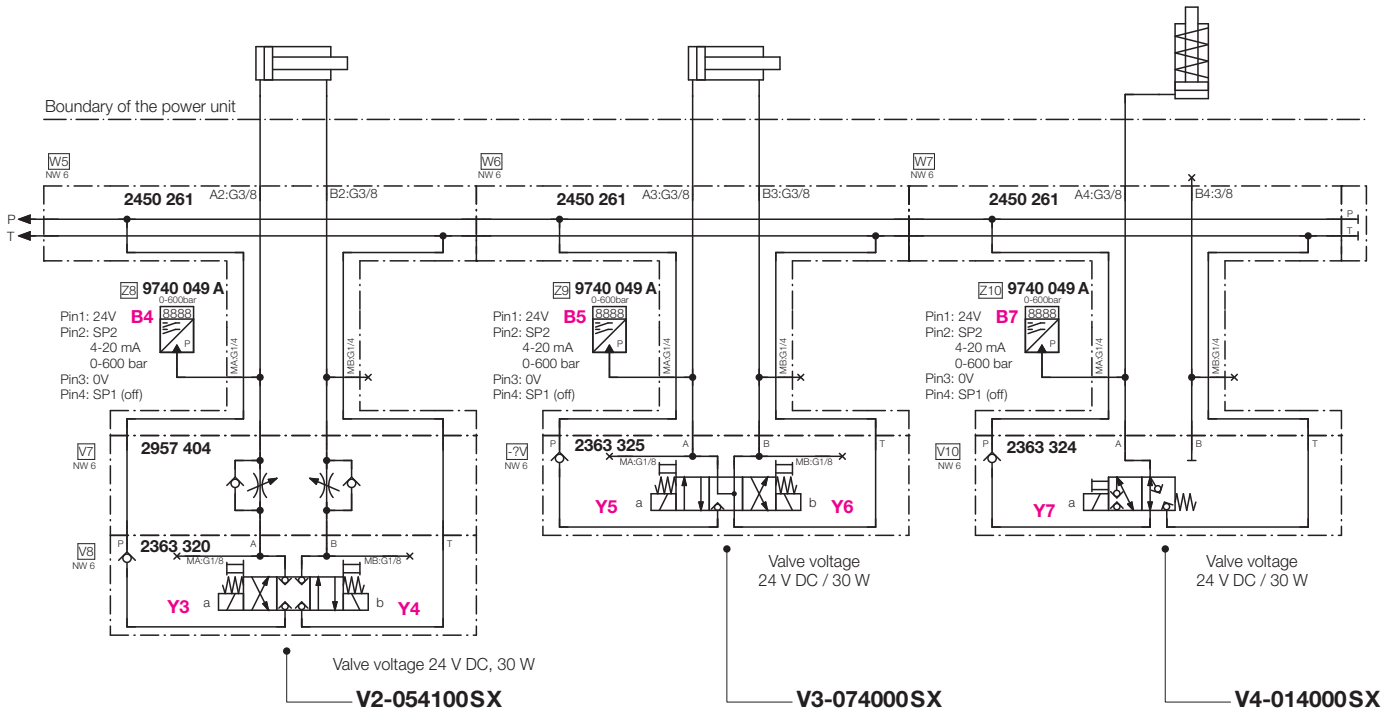
The calculation of the relative duty cycle is based on a cycle time of 10 min. With 40 % ED, e.g. the maximum load within the cycle should not exceed 4 min.
During the remaining time, the motor can carry a load of up to 50 % of the nominal output and should run continuously.

* Other voltages/frequencies as well as special approvals on request.

B0 = Electronic system pressure switch with teach-in function



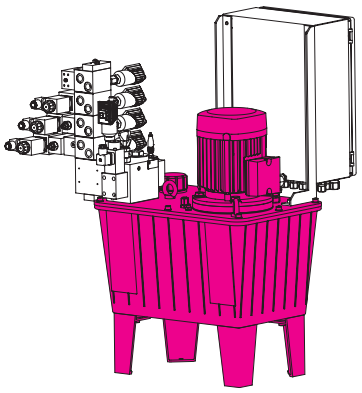
Z1				FE1				M1				P1			
Reservoir volume	:	27 Liter		Filter element				n	=	1400	U/min	p	=	500/80	bar
Hydraulic oil	:	HPL32		Type	:	10 µm		P	=	0,75	kW	Q	=	0,7/5,2	l/min
Norm	:	ISO6743/4		Part no.	:	3887 107		U	=	400	V	n	=	1400	U/min
								f	=	50	Hz				



Subject to modifications

Power units in modular design
Type code for power unit size “PMXX“

Type code: **PMXX**_AXXX_V1-XX X XXX SX_V2-XX X XXX SX_V3-XX X XXX SX_V4-XX X XXX SX_EX



Basic power unit

The basic selection takes place based on operating pressure p and flow rate Q. The size of the reservoir depends on the application conditions (e. g. environmental temperature, cycle time and function)

*** Note**

In case of the two-stage pump (RZ) the gear pump (large flow rate) is switched to unpressurised cycles by the integrated idling control valve as soon as a pressure of 80 bar is exceeded. Up to 80 bar, both flow rates will add up.

4 reservoir sizes: 11 l, 27 l, 40 l, 63 l

5 motor sizes: 0.75 kW, 1.1 kW, 1.5 kW, 2.2 kW, 3.0 kW

15 pump types: 0.9 to 12 l/min flow rate

(gear pump, piston pump and two-stage pump*)

Example:

Reservoir 11 l, max. 200 bar, gear pump 1.5 l/min, 0.75 kW = **PM 01**

Reservoir 27 l, max. 350 bar, piston pump 3.6 l/min, 2.2 kW = **PM 19**

Operating pressure [bar]		**Flow rate**	**Motor rating**	**Reservoir volume**	**Pump type**	**PM XX**
at 100 % ED	**at 40 % ED****	**Q** [l/min]	**P** [kW]	**V** [l]		
425	**500**	0.9	0.75	11	Piston pump	**02**
425	**500**	0.9	0.75	27	Piston pump	**09**
425	**500**	0.9	0.75	40	Piston pump	**21**
425	**500**	0.9	0.75	63	Piston pump	**38**
375	**500**	1.5	1.1	11	Piston pump	**05**
375	**500**	1.5	1.1	27	Piston pump	**12**
375	**500**	1.5	1.1	40	Piston pump	**24**
375	**500**	1.5	1.1	63	Piston pump	**41**
430	**500**	2.6	2.2	27	Piston pump	**18**
430	**500**	2.6	2.2	40	Piston pump	**30**
430	**500**	2.6	2.2	63	Piston pump	**47**
415	**500**	3.7	3.0	40	Piston pump	**34**
415	**500**	3.7	3.0	63	Piston pump	**51**
500	**500**	0.7/5.2*	0.75	11	Two-stage pump	**03**
500	**500**	0.7/8.8*	1.5	11	Two-stage pump	**54**
500	**500**	0.7/5.2*	0.75	27	Two-stage pump	**10**
500	**500**	0.7/5.2*	0.75	40	Two-stage pump	**22**
500	**500**	0.7/5.2*	0.75	63	Two-stage pump	**39**
365	**450**	4.2	3.0	40	Piston pump	**35**
365	**450**	4.2	3.0	63	Piston pump	**52**
310	**400**	2.5	1.5	11	Piston pump	**07**
310	**400**	2.5	1.5	27	Piston pump	**14**
310	**400**	2.5	1.5	40	Piston pump	**26**
310	**400**	2.5	1.5	63	Piston pump	**43**
310	**350**	3.6	2.2	27	Piston pump	**19**
310	**350**	3.6	2.2	40	Piston pump	**31**
310	**350**	3.6	2.2	63	Piston pump	**48**
290	**350**	5.3	3.0	40	Piston pump	**36**
290	**350**	5.3	3.0	63	Piston pump	**53**
200	**200**	1.5	0.75	11	Gear pump	**01**
200	**200**	1.5	0.75	27	Gear pump	**08**
200	**200**	1.5	0.75	40	Gear pump	**20**
200	**200**	1.5	0.75	63	Gear pump	**37**
170	**200**	3.3	1.1	11	Gear pump	**04**
170	**200**	3.3	1.1	27	Gear pump	**11**
170	**200**	3.3	1.1	40	Gear pump	**23**
170	**200**	3.3	1.1	63	Gear pump	**40**
170	**200**	4.5	1.5	11	Gear pump	**06**
170	**200**	4.5	1.5	27	Gear pump	**13**
170	**200**	4.5	1.5	40	Gear pump	**25**
170	**200**	4.5	1.5	63	Gear pump	**42**
180	**200**	6.2	2.2	27	Gear pump	**15**
180	**200**	6.2	2.2	40	Gear pump	**27**
180	**200**	6.2	2.2	63	Gear pump	**44**
175	**200**	8.8	3.0	40	Gear pump	**32**
175	**200**	8.8	3.0	63	Gear pump	**49**
130	**160**	8.8	2.2	27	Gear pump	**16**
130	**160**	8.8	2.2	40	Gear pump	**28**
130	**160**	8.8	2.2	63	Gear pump	**45**
130	**160**	12	3.0	40	Gear pump	**33**
130	**160**	12	3.0	63	Gear pump	**50**
99	**120**	12	2.2	40	Gear pump	**29**
95	**120**	12	2.2	27	Gear pump	**17**
95	**120**	12	2.2	63	Gear pump	**46**

** see page 2 “Electrical characteristics - Motor”

Pumps

Piston pumps	
Type	radial piston pump
Nominal pressure max.	500 bar
Flow rates*	3.6 / 5.3 l/min to 350 bar
	2.5 l/min to 400 bar
	4.2 l/min to 450 bar
	0.9 / 1.5 / 2.6 / 3.7 l/min to 500 bar
Direction of rotation**	any
Speed range	continuous operation 100 ... 2000 1/min, short-time operation up to 2850 1/min
Feature	high-pressure application, harsh operating conditions (e.g. punching / stamping)

Gear pumps	
Type	2 opposite gears
Nominal pressure max.	200 bar
Flow rates*	1.5 / 3.3 / 4.5 / 6.2 / 8.8 l/min to 200 bar
	12 l/min to 160 bar
Direction of rotation**	clockwise rotation
Speed range	700 ... 3000 1/min
Feature	intermediate-pressure application, high flow rate

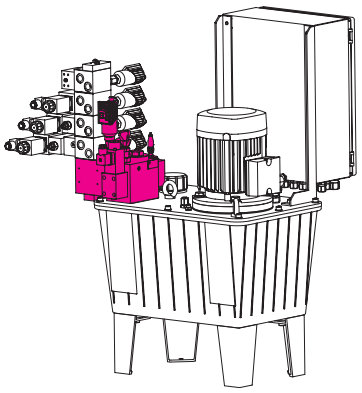
Two-stage pump		
Type		radial piston pump and gear pump screwed together
		continuous drive shaft
Nominal pressure max.		500 bar
Flow rate*	up to approx. 80 bar	total flow rate active (gear plus piston pump)
	from approx. 80 bar	only flow rate of piston pump active
Direction of rotation**		counterclockwise rotation
Speed range		700 ... 2000 1/min, in short-time operation up to 2850 1/min
Feature		high flow rate up to approx. 80 bar, high pressure up to 500 bar
Typical application		quickly move large volume consumers and clamp them with high pressure

* at rated speed 1450 1/min
** direction of rotation (view from above onto the drive shaft)

Different flow rates and other pumps are available on request.

Subject to modifications

Type code: PMXX_**AXXX**_V1-XX X XXX SX_V2-XX X XXX SX_V3-XX X XXX SX_V4-XX X XXX SX_EX



Standard equipment
- Connecting block with pressure relief valve
- System check valve
- Pressure filter 10 µm
- Oil level gauge
- Oil temperature gauge (stick thermometer)
- Filler and reservoir ventilation
- Prepared for additional features

Connecting block basic functions
In addition to the standard equipment, additional features for the basic unit can be selected.

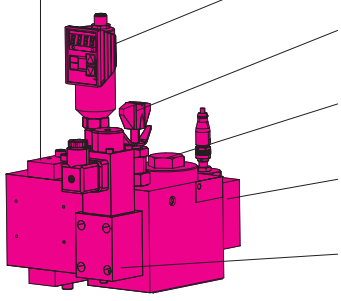
AXXX

with pressure gauge, without system pressure switch, without valve for unpressurised cycle	**0**
with electronic system pressure switch for intermittent cycle	**1**
with electronic system pressure switch and valve for unpressurised cycle, p_{max} = 500 bar	**2**
with electronic system pressure switch and valve for unpressurised cycle, p_{max} = 315 bar	**3**
with pressure gauge, without system pressure switch, with valve for unpressurised cycle, p_{max} = 500 bar	**4**
with pressure gauge, without system pressure switch, with valve for unpressurised cycle, p_{max} = 315 bar	**5**

with visual temperature and oil level display (standard)	**0**
with temperature and oil level control switch and visual temperature and oil level display	**1**

with pressure filter (standard)	**0**
pressure and return filter	**1**
pressure filter with filter control	**2**
pressure filter and return filter with filter control	**3**

Connecting block including pressure filter and pressure relief valve, P port G 3/8, R port G 1/2 and system check valve
(The retrofitting of individual features is possible at any time).



System check valve (standard)

Electronic system pressure switch with teach-in function (option)

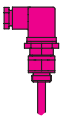
Pressure relief valve (standard)

Pressure filter 10 µm (standard)

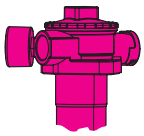
Pressure filter control (option)

Valve for unpressurised cycles (option)

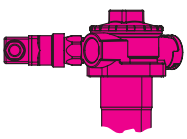
Additional options:



Oil control (oil level / oil temperature)



Return filter 16 µm



Return filter 16 µm with filter control

Note for teach-in function
For teaching, the desired switching as well as reverse switching points are calculated and saved by pressing the Enter/Set key of the system pressure switch. The system is thus set and ready for operation, parameterisation of individual values is not required.

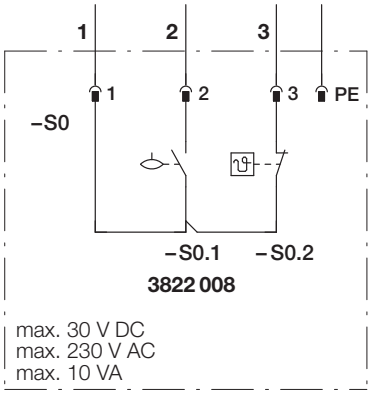
Detailed operating instructions are available on request.

Monitoring functions - Power unit

Oil control (oil temperature too high or oil level too low)

Contact oil temperature	break contact, opens at approx. 63 °C
Contact oil level	make contact, closes when oil above the float
Type of connection	connector, 3-pin as per DIN 43650 Pin 1: common root Pin 2: level Pin 3: temperature
Max. switching voltage	230 VAC
Max. switching current	1 A
Max. contact rating	10 VA
Medium temperature max.	85 °C
Code class	IP 65
For oil reservoir 11 litres	**Part no. 3822008**
For oil reservoir 27 litres	**Part no. 3822006**
For oil reservoir 40 litres	**Part no. 3822048**
For oil reservoir 63 litres	**Part no. 3822005**

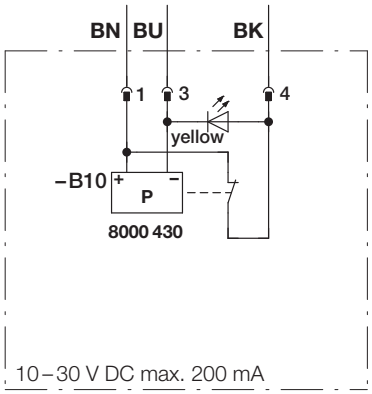
Note: The oil control can be retrofitted.
Several switching points for temperature and/or level on request.



Pressure filter control
Proximity switch with integrated function display

Operating voltage	10…30 VDC
Switching current	200 mA, 24 V DC
Output	break contact, opens in the event of contamination
Connection	connector, M12, 4-pin
Part no.	**8000430**

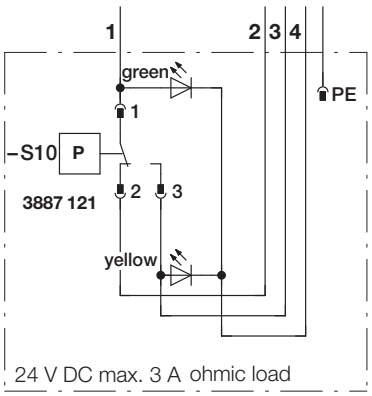
Note: The pressure filter control can be retrofitted.



Return filter control

Operating pressure	0…10 bar
Material	body polyamide, connecting parts steel galvanised, membrane NBR, seal copper
Code class	IP 67
Electrical connection	cable socket DIN 43650 - AF3
	cable diameter 6…8 mm
Max. switching voltage	30 V DC
Max. switching current	0.25 A
Max. contact rating	3 W
Part no.	**3887121**

Note: The return filter control can be retrofitted.



Type code for valve bloc for contro circuits “V1-XX X XXX SX” to “V4-XX X XXX SX”

Type code: PMXX_AXXX_**V1-XX X XXX SX**_V2-XX X XXX SX_V3-XX X XXX SX_V4-XX X XXX SX_EX

The determination of control circuit V2-XX X XXX SX, V3-XX X XXX SX and V4-XX X XXX SX is the same as of control circuit V1-XX X XXX SX.

V1-XX X XXX SX

Control valves

	Function*	
as reserve space	with blind plate	00
3/2 directional poppet valve, 500 bar, without auxiliary energy P→A	1 x single acting	01
3/2 directional poppet valve, 500 bar, without auxiliary energy A→R	1 x single acting	02
3/2 directional poppet valve, 250 bar, without auxiliary energy P→A	1 x single acting	03
3/2 directional poppet valve, 250 bar, without auxiliary energy A→R	1 x single acting	04
4/3 directional poppet valve, 500 bar, without auxiliary energy all connections closed	1 x double acting	05
4/3 directional poppet valve, 250 bar, without auxiliary energy all connections closed	1 x double acting	06
4/3 directional poppet valve, 500 bar, without auxiliary energy A+B→R	1 x double acting	07
4/3 directional poppet valve, 250 bar, without auxiliary energy A+B→R	1 x double acting	08
2 x 3/2 directional poppet valve, 500 bar, without auxiliary energy P→A+B	2 x single acting	09
2 x 3/2 directional poppet valve, 500 bar, without auxiliary energy A+B→R	2 x single acting	10
2 x 3/2 directional poppet valve, 500 bar, without auxiliary energy P→A / B→R	2 x single acting	11
2 x 3/2 directional poppet valve, 250 bar, without auxiliary energy P→A+B	2 x single acting	12
2 x 3/2 directional poppet valve, 250 bar, without auxiliary energy A+B→R	2 x single acting	13
2 x 3/2 directional poppet valve, 250 bar, without auxiliary energy P→A / B→R	2 x single acting	14
2 x 4/2 directional spool valve, 315 bar, without auxiliary energy P→A / B→R	1x double-acting, not leakage-free	15
4/3 directional spool valve, 315 bar, without auxiliary energy all connections closed	1x double-acting, not leakage-free	16
4/3 directional spool valve, 315 bar, without auxiliary energy A+B→R	1x double-acting, not leakage-free	17
4/3 directional spool valve, 315 bar, without auxiliary energy P→R, A+B closed	1x double-acting, not leakage-free	18
4/3 directional spool valve, 315 bar, without auxiliary energy all connections connected	1x double-acting, not leakage-free	19
without mounting plate, P and R closed	without	XX

Pressure switch

without pressure switch for machine tool interlock	0
piston pressure switch in A for machine tool interlock	1
piston pressure switch in B for machine tool interlock	2
one each piston pressure switch in A + B for machine tool interlock	3
electronic pressure switch in A for machine tool interlock	4
electronic pressure switch in B for machine tool interlock	5
one each electronic pressure switch in A + B for machine tool interlock	6

Flow control valves

without flow control valve	0
with flow control valve in A+B, supply throttling, 500 bar	1
with flow control valve in A+B, supply throttling, 315 bar	2

Pressure valves

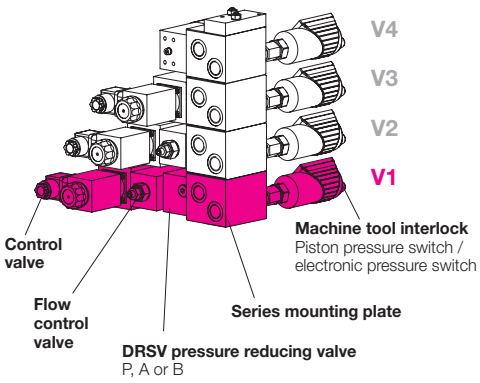
without pressure reducing valve	0
pressure reducing valve in A with pressure display	1
pressure reducing valve and pressure relief valve in A with pressure display	2
pressure reducing valve in P with pressure display	3
pressure reducing valve in P and pressure relief valve in A with pressure display	4
pressure reducing valve in P and pressure relief valve in B with pressure display	5
pressure reducing valve in P and pressure relief valve in A + B with pressure display	6
pressure relief valve in A	7
pressure relief valve in B	8
pressure relief valve in A + B	9

Check valves

without intermediate plate check valves	0
intermediate plate twin check valves in A+B max. 315 bar	1
intermediate plate check valve in A max. 315 bar	2
intermediate plate check valve in B max. 315 bar	3

Switch

without switch	0
hand switch, latching with pilot light green	1
foot switch, latching with pilot light green	2
3-way selector switch, latching with pilot light green	3
key switch, latching with pilot light green	4
2x hand switch, latching with pilot light green	5
2x foot switch, latching with pilot light green	6
2x key switch, latching with pilot light green	7



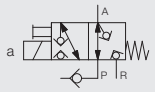
Valve block (max. 4 control circuits V1 – V4)
The equipment of the control circuits is based on the functional requirements of the application. The maximum pressures as well as the design-related differences in poppet and spool valves are to be considered.

Special versions
Switch combinations and special switches are possible on request.
It is also always possible to deviate from the prescribed standard.
For example, more than 4 control circuits can be set up. It is possible to implement additional hydraulic functions.
The electrical control can be designed even more individually up to the installation of programmable logic controllers and touch panels for human-machine communication.

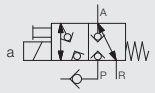
Switching symbols

Control valves

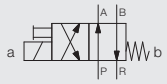
3/2 directional poppet valve
V1-01
V1-03



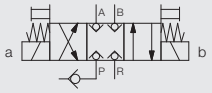
V1-02
V1-04



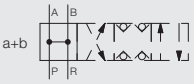
4/2 directional spool valve
V1-15



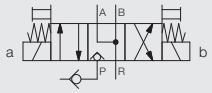
4/3 directional poppet valve
V1-05
V1-06



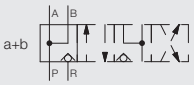
with 4th switching function
Solenoid "a" and "b" operated



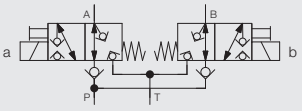
V1-07
V1-08



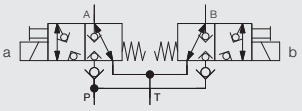
with 4th switching function
Solenoid "a" and "b" operated



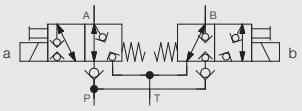
Double 3/2 directional poppet valve
V1-09
V1-12



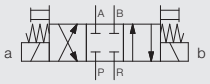
V1-10
V1-13



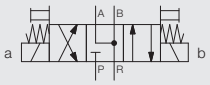
V1-11
V1-14



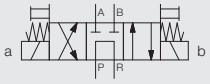
4/3 directional spool valve
V1-16



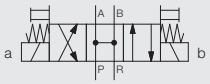
V1-17



V1-18



V1-19



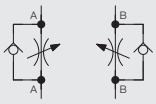
Pressure switch

Piston pressure switch
V1-XX 1
V1-XX 2
V1-XX 3

Electronic pressure switch
V1-XX 4
V1-XX 5
V1-XX 6

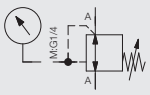
Flow control valves

Flow control valve
V1-XX X 1
V1-XX X 2

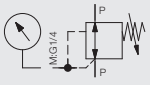


Pressure valves

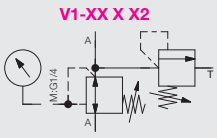
Pressure reducing valve
V1-XX X X1



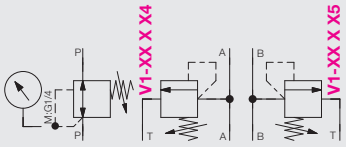
V1-XX X X3



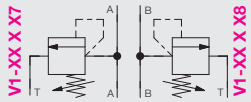
Pressure reducing valve with pressure relief valve
V1-XX X X2



V1-XX X X6

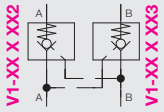


Pressure relief valve
V1-XX X X9



Check valves

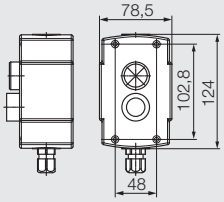
Intermediate plate twin check valve
V1-XX X XX1



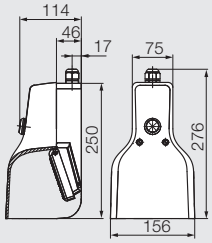
Switch

Connecting cable 3 m, other lengths on request

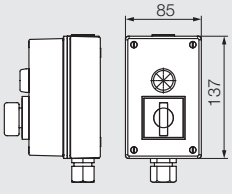
Hand switch
V1-XX X XXX S1



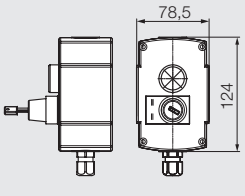
Foot switch
V1-XX X XXX S2



3-way selector switch
V1-XX X XXX S3



Key switch
V1-XX X XXX S4



Subject to modifications

Types of valves

Poppet valves, hermetically sealed	
Adm. operating pressure	up to 500 bar
Adm. flow rate	up to 20 l/min
Flow direction	in the direction of the arrow as per symbol
Hydraulic oil	HLP 22 as per DIN 51524
Connection	flange for mounting plate assembly
Type of mounting	4 screws M5 (12.9) Tightening torque: 9.3 Nm
Nominal voltage	24 VDC, +5 % / –10 %
Pick-up and holding power	30 W
Make time	60 ms
Brake time	60 ms
Max. cycles	2000 /h
Duty cycle	100 % ED
Code class	IP 65 (IEC 60529)
Connection	cable socket as per DIN EN 175 301-803 and ISO 4400

Spool valves, leakage-afflicted	
Leakage rate	up to 20 ccm/min at 100 bar
Adm. operating pressure	up to 315 bar
Adm. flow rate	up to 80 l/min
Flow direction	in the direction of the arrow as per symbol
Hydraulic oil	HLP 32 or 46 as per DIN 51524
Connection	flange, hole pattern as per DIN 24340, form A CETOP 4.2 – 4.3, ISO 4401 for mounting plate assembly
Type of mounting	4 screws M 5 (10.9) Tightening torque: 8.1 Nm
Nominal voltage	24 VDC, + 10 % / –10 %
Pick-up and holding power	30 W
Make time	20 – 45 ms
Brake time	10 – 25 ms
Max. cycles	15000/h
Duty cycle	100 % ED
Code class	IP 65 as per DIN 40050
Connection	cable socket as per DIN EN 175 301-803 and ISO 4400

Other voltages and/or actuations available on request

Pressure reducing valves		
Max. input pressure	[bar]	500
Adjustable output pressure	[bar]	30 … 380
(other pressure ranges on request)		

Pressure relief valves		
Max. input pressure	[bar]	500
Adjustable reaction pressure	[bar]	50 … 500
(other pressure ranges on request)		

For the protection of pressure reducing valves, additional pressure relief valves are recommended.

Pressure switch variants

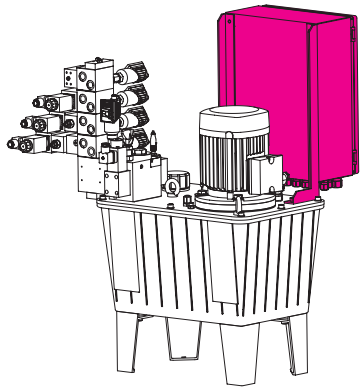
Electronic pressure switches	
Recommended hydraulic oil	HLP 22, 32 and 46 as per DIN 51524
Pressure ranges	0 … 600 bar
Excess pressure [bar]	50 % of the nominal pressure (PN)
Pressure pick-up	Peak-value memory every 2 ms
Operating voltage	12 to 32 V DC (residual ripple < 10 %), protected against reverse polarity
Voltage drop	< 2 V
Current consumption	< 60 mA
Switching outputs	2 x pnp switching, no/nc 250 mA short circuit protection switching output 2 is omitted if current output is parameterised
Delay time	0 to 20 s, switch on and off delay separately adjustable
Range of adjustment switching point	6 to 600 bar
Reverse switching point	5 to 594 bar
Switching frequency	max. 125 Hz
Reproducibility	< ±0.1 % of the final value
Current output	if parameterised, switching output 2 is omitted 0/4 to 20 mA, 20 to 0/4 mA, starting point and final point selectable
Load	max. RL [W] = (Ub – 8V) / 20 mA
Error detection	analogue output in case of line break
Rise time	5 ms (10 % to 90 % of PN)
Damping	0 to 20 s, adjustable
Linearity deviation	max. ± 0.25 % of PN
System pressure display	4 x 7 segment LED display
Display damping	0 to 20 s, adjustable
Switching function display	2x LED red
Operating temperature	–20 °C to +80 °C
Temperature drift	< ±0.2 % / 10 K (–10 °C to +70 °C)
Pressure port	G1/4 A, SW 22
Sensor head material	stainless steel 1.4435
Housing material	PA 6.6, polyester
Code class	IP 65 as per EN 60529
Electric connection	M12 connector 4-pin
As system pressure switch	**Part no. 9740050A*** with teach-in function for easy system pressure adjustment
For machine tool interlock	**Part no. 9740049A***

* Detailed operating instructions available on request

Mechanical pressure switch	
Piston switch	Technical data as per data sheet F 9.732

Subject to modifications

Type code: PMXX_AXXX_V1-XX X XXX SX_V2-XX X XXX SX_V3-XX X XXX SX_V4-XX X XXX SX_**EX**



Electronics
The function triggering can be realised in various ways.

The following features are available for selection:

- **without electric control, without terminal box**
  connection of the individual components and electric control provided by the customer
- **with terminal box, without electric control**
  connections of the individual components are connected to the terminal strip of the terminal box, the connection will be made to the customer’s electric control
- **with electric control**
  function triggering by customer contacts or selected switches

_E X

without electric control, without terminal box.	**0**
with terminal box	**1**
with electric control and function triggering provided by the customer	**2**
with electric control and function triggering in a common housing	**3**
with electric control and function triggering in individual housings	**4**

U = 3/ N / PE 400 V 50 Hz
Other voltages and frequencies of 1 Ph. 110 V to 3 Ph. 500 V 50/60 Hz on request.
Special approvals on request.

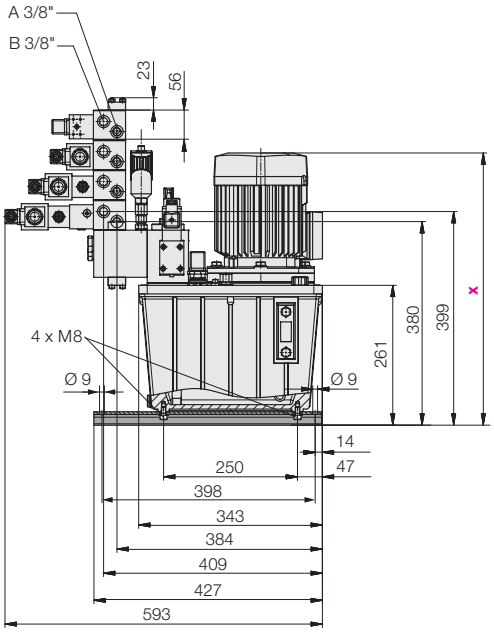
E2 - Function triggering provided by the customer:
Potential free contacts from a customer control.

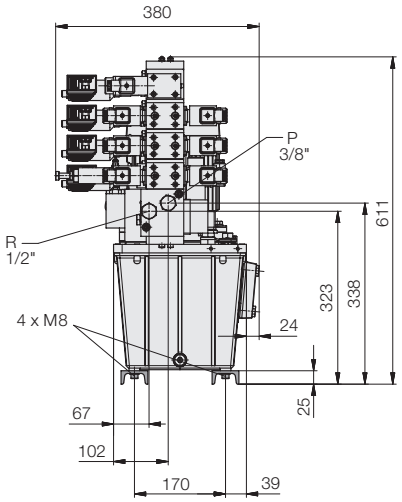
E3 - Function triggering in a common housing:
The selected switches in control circuits are installed in one operating housing and connected to the electrical control.

E4 - Function triggering in individual housings:
The selected switches in the control circuits are designed as shown on page 9 and individually connected to the electric control.

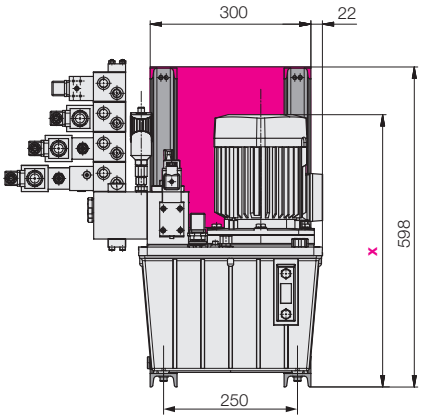
Example power unit 11 litres

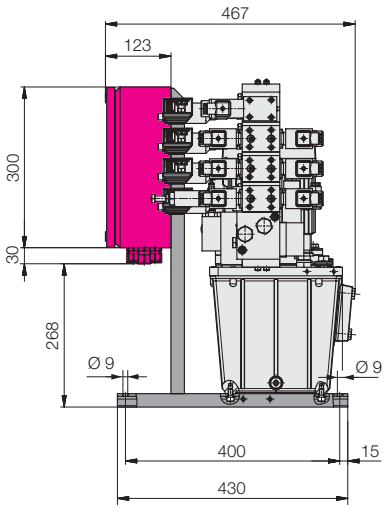
without electronics _E0



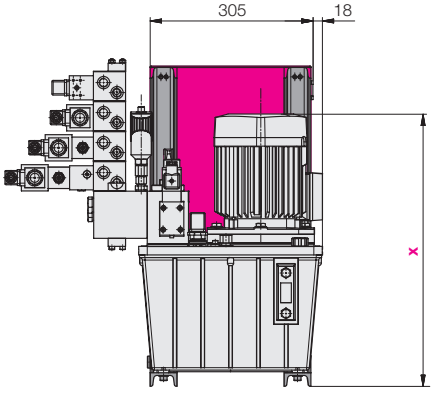


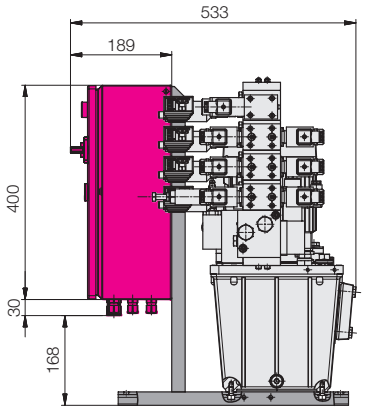
with terminal box _E1





with electric control _E2, _E3, _E4





Dimensions in mm

Subject to modifications

Example power unit 11 litres

(Dimensions in mm)

Power unit 11 litres		
Motor 0.75 kW	**x**	509
Motor 1.1 kW	**x**	575
Motor 1.5 kW	**x**	575

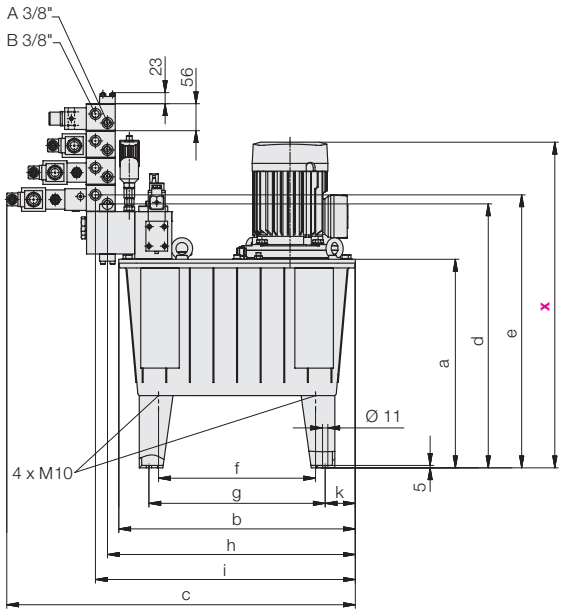
Reservoir volume	Type code for example power unit	Part no.*
11	PM 03_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E0	8456004
11	PM 03_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E1	8456003
11	PM 03_A212_V1-054110S1_V2-054100S1_V3-074000S1_V4-014000S1_E4	8456002

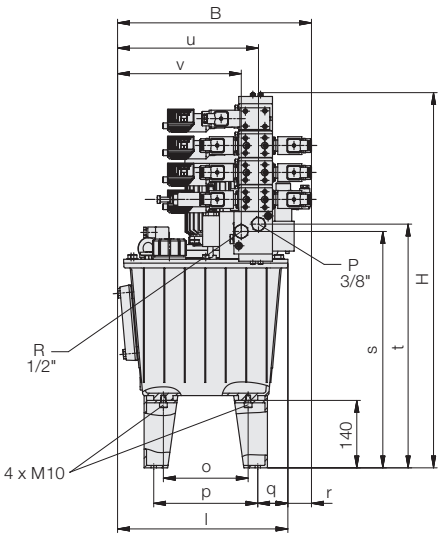
* Orders can be placed with the type code or – if available – with the part number.

Subject to modifications

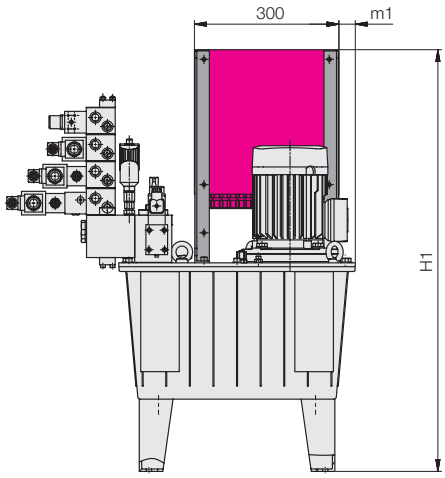
Example power unit 27 / 40 / 63 litres

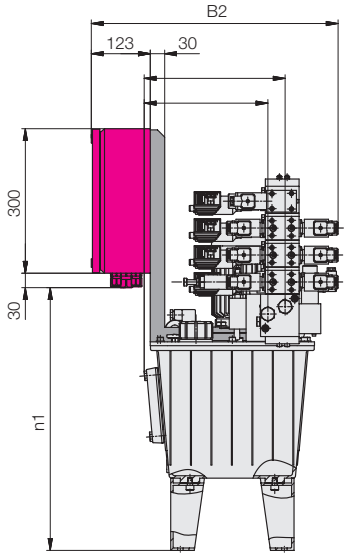
without electronics _E0



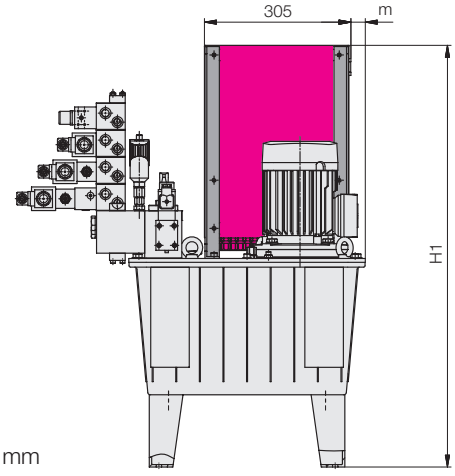


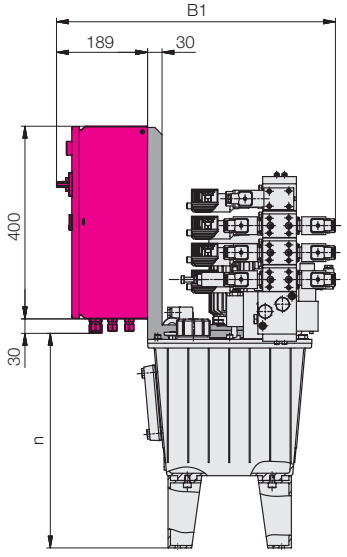
with terminal box _E1





with electric control _E2, _E3, _E4





Dimensions in mm

Example power unit 27 / 40 / 63 litres

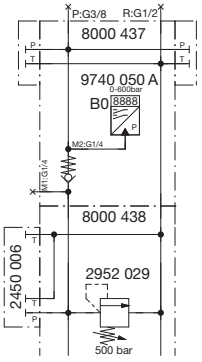
(Dimensions in mm)

Dimension table power unit	27 litres	40 litres	63 litres
Motor 0.75 kW x	677	707	757
Motor 1.1 kW x	743	773	823
Motor 1.5 kW x	743	773	823
Motor 2.2 kW x	794	824	874
Motor 3.0 kW x		824	874
a	433	463	513
b	491	525	615
c	724	758	848
B	403	485	539
B1	579	662	712
B2	513	596	646
d	548	578	628
e	567	597	647
f	326	341	423
g	366	381	463
h	515	549	639
H	779	809	859
H1	876	906	956
i	540	574	664
j	233	233	233
k	63	72	77
l	354	436	490
m	30	41	66
m1	34	45	70
n	446	476	526
n1	546	576	626
o	176	241	283
p	216	281	323
q	63	72	76
r	49	49	49
s	491	521	571
t	506	536	586
u	293	375	429
v	257	339	393

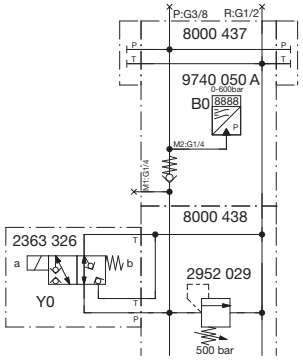
Reservoir volume	Type code for example power unit	Part no.*
27	**PM10_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E0**	**8457003**
27	**PM10_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E1**	**8457002**
27	**PM10_A212_V1-054110S1_V2-054100S1_V3-074000S1_V4-014000S1_E4**	**8457001**
40	**PM22_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E0**	**8458003**
40	**PM22_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E1**	**8458002**
40	**PM22_A212_V1-054110S1_V2-054100S1_V3-074000S1_V4-014000S1_E4**	**8458001**
63	**PM39_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E0**	**8459003**
63	**PM39_A212_V1-054110S0_V2-054100S0_V3-074000S0_V4-014000S0_E1**	**8459002**
63	**PM39_A212_V1-054110S1_V2-054100S1_V3-074000S1_V4-014000S1_E4**	**8459001**

* Orders can be placed with the type code or – if available – with the part number.

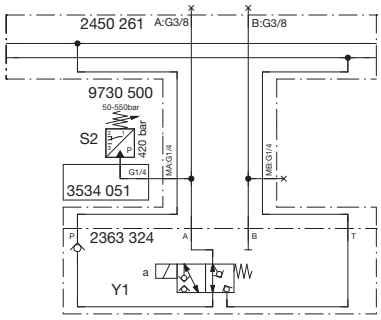
PMXX_A1
intermittent cycle



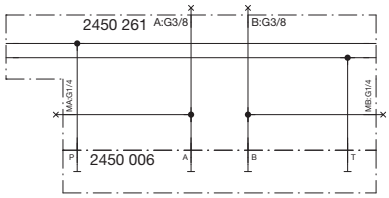
PMXX_A2_...
unpressurised cycle, 500 bar



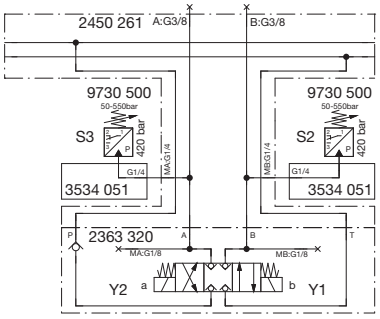
PMXX_AXXX_V1-011000_...
1x single acting, 500 bar with MI in A



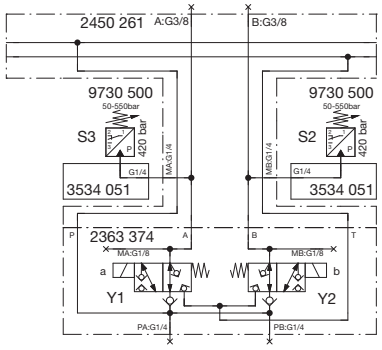
PMXX_AXXX_V1-XXXXXX_V2-000000_...
2nd valve combination as reserve space, closed with a blind plate for later retrofitting



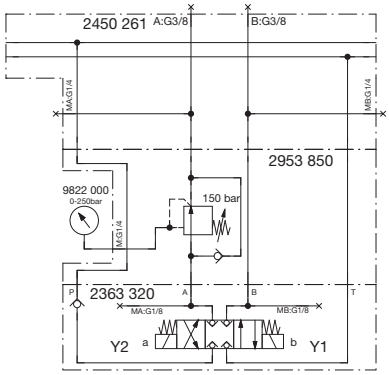
PMXX_AXXX_V1-053000_...
1x double acting, 500 bar with MI in A+B



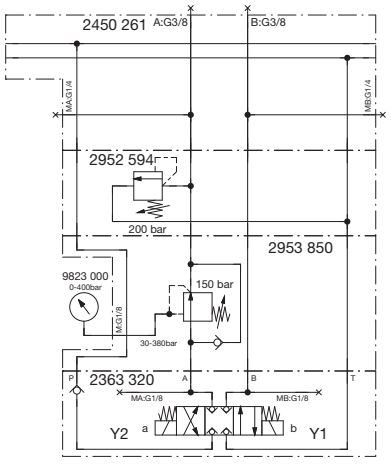
PMXX_AXXX_V1-093000_...
2x single acting, 500 bar with MI in A+B



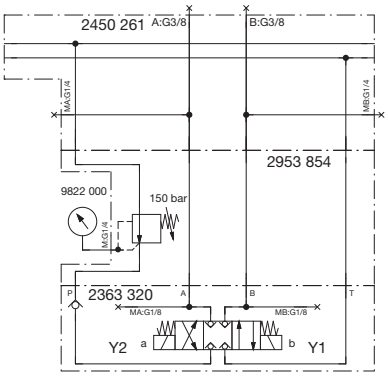
PMXX_AXXX_V1-050010_...
1x double acting, valve 500 bar pressure reduction in A, 150 bar



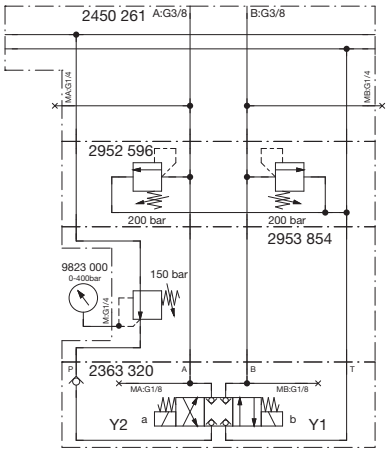
PMXX_AXXX_V1-050020_...
1x double acting, valve 500 bar pressure reduction in A, 150 bar



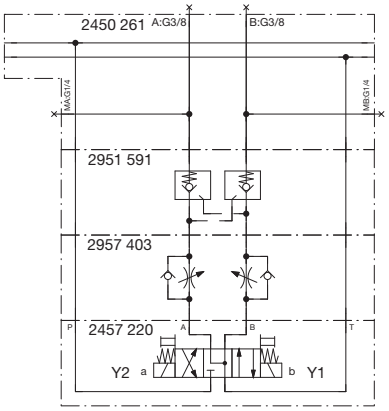
PMXX_AXXX_V1-050030_...
1x double acting, valve 500 bar pressure reduction in P, 150 bar



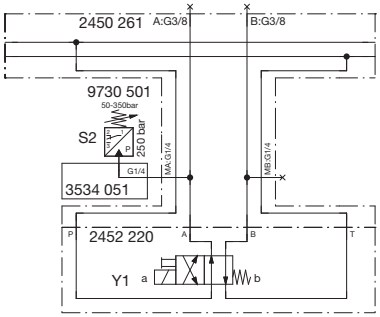
PMXX_AXXX_V1-050060_...
1x double acting, valve 500 bar pressure reduction in P, 150 bar



PMXX_AXXX_V1-170201_...
1x double acting, 350 bar with twin flow control check valve and twin check valve



PMXX_AXXX_V1-151000_...
1x double acting, 315 bar with MI in A one of the two pressure lines is always under pressure



Subject to modifications