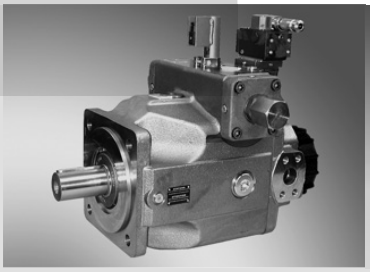
Rexroth
Bosch Group

Secondary control with A4VSO/G axial piston units

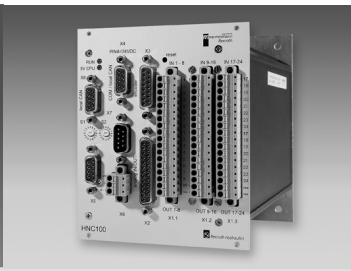
RE 92056/10.04 1/28
Replaces: 01.04

Type A4VSO...DS1

Nominal size 40...1000
Series 1X, 3X
Nominal pressure 315 bar
Peak pressure 400 bar



Secondary unit
Type A4VSO250DS1



Digital closed loop control assembly HNC100-SEK

Overview of contents

Features

- Highly dynamic rotary drive
- Motor and generator operation in both directions of rotation
- Energy recovery and energy storage
- With speed, position or closed loop torque control with high accuracy and dynamics
- Throttle-free coupling and energy transmission of as many independently working (motor or generator driven) machines as required, to a common supply with quasi-constant operating pressure
- Compact digital closed loop control electronics

Function

Secondary controlled hydrostatic drives are connected to a power supply with a quasi-constant operating pressure to form the basis for an energy saving drive concept with high dynamics for creating closed loop speed, position or torque controls with energy recovery.

The power consumption or return into the supply network is not throttled and is matched to the demand by matching the stroke volume of the unit to the relevant load.

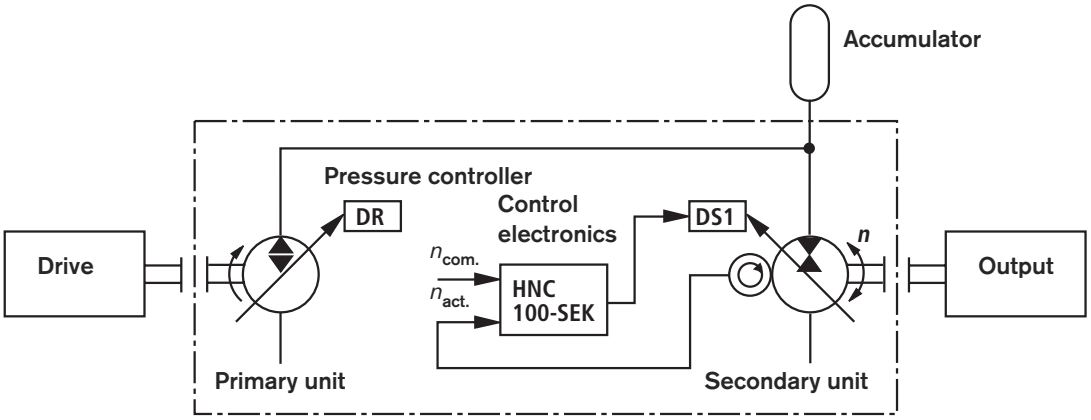
This means that any number of units, operating as motors or pumps, may be connected in parallel. Four quadrant operation is possible, however the units for speed or torque reversal have to be swiveled over "centre". Thereby the direction of flow is also reversed.

If required an accumulator may be fitted between the primary and secondary units.

The accumulator is used to cover rapid flow peaks. Furthermore it is used to store the energy that comes from the secondary unit during pump operation into the hydraulic net, when this energy is not required by any other actuator. Together with the pressure controlled primary unit and the operating status of the secondary unit the load condition of the accumulator and its pre-charge determine the quasi-constant high pressure in the system.

The specific characteristics of secondary control such as reducing the amount of equipment required at the primary side, combined with the possibility of energy recovery, the storage of braking energy and the virtually load-independent speed and positioning accuracy, open up a wide range of applications.

For further information see "Hydraulic Trainer Volume 6" (RE 00293).



Secondary unit components

1 Axial piston unit A4VSO...DS1

1.1 4-way servo valve (see RE 29583)

NS	Type
40, 71	4WS2EM10-5X/20B11ET315K31EV
125, 180	4WS2EM10-5X/30B11ET315K31EV
250, 355	4WS2EM10-5X/45B11ET315K31EV
500, 750, 1000	4WS2EM10-5X/75B11ET315K31EV

Alternative: Proportional valve

1.2 Swivel angle transducer IW9-03-DT (see page 26)
Alternative: Integrated spool position transducer

2 Sandwich plate filter – Ordering detail: **Z**
(not required when a proportional valve is used)

NS	Type
40, 71	DFZBH/HC060QC10Y1X/V
125 to 1000	DFZBH/HC110QC10Y1X/V

With optical and electrical clogging indicator: VD2.0X/-V-C24

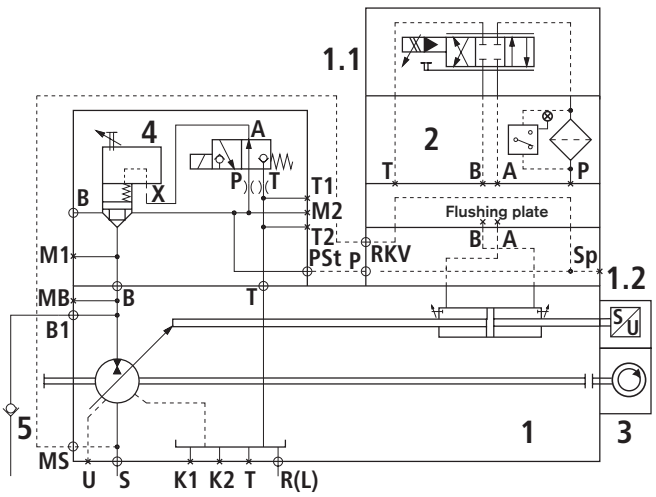
3 Incremental encoder GEL 293
(Ordering details: **T03 or T04**) (see page 25)

4 Electrically operated check valve (isolating valve)
(Ordering detail: **1**) (see page 26)

5 Anti-cavitation valve, **separate order** (see page 26)

Associated electronics:
Digital closed loop controller assembly SYHNC100SEK (RE 30141) valve amplifier

Circuit A4VSO
A4VSOXXXDS1/XXW–XXX13T031Z



Technical data: axial piston unit A4VSO (valid for mineral oil)

Operating pressure (pressure range details to DIN 24312)

Pressure at port B

Nom. pressure p_N 1) 315 bar

Peak pressure p_{max} 400 bar

Absolute pressure at port S (suction opening)

$p_{abs\ min}$ 0.8 bar

A boost pump can be connected to port S.

Boost pressure range

Max. boost pressure $p_{E\ max}$ 30 bar

Recommended boost pressure p_E 16 bar

Boost pump inlet pressure

Suction pressure $p_{S\ abs\ min}$ (ν = 10 to 300 mm²/s) ≥ 0.7 bar

Control pressure range

Max. permissible control pressure 1) p_{max} = 315 bar

Min. recommended control pressure p_{min} = Operating pressure or 150 bar (see diagram)

Leakage oil pressure

Max. leakage oil pressure (housing pressure)

$p_{L\ abs\ max}$ 4 bar

Installation orientation

Optional. The pump housing must be filled on commissioning and remain full during operation.

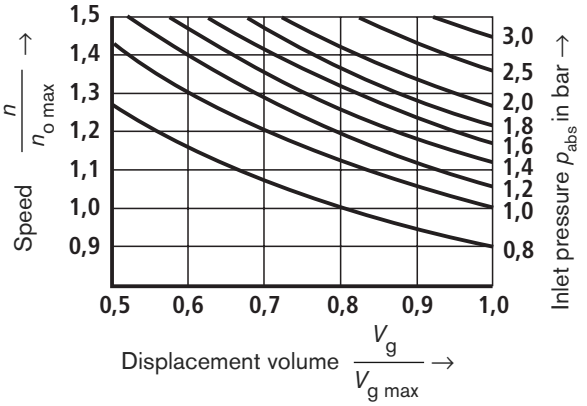
Note: The values in the table are guidance values and under certain operating conditions may have to be reduced.

1) Determined from the permissible servo valve data and other system components

☞ **A4VSG applications after technical clarification.**

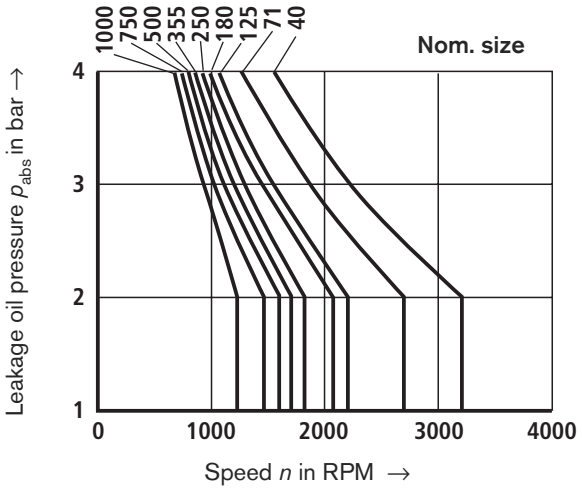
Determination of the inlet pressure p_{abs} at the suction port S with an increase of speed

Definition $n_{o\ max}$ see table on page 4.

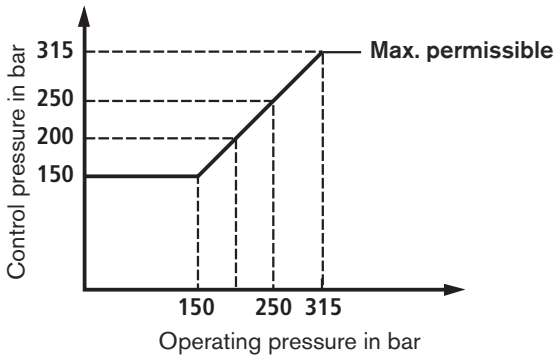


Leakage oil pressure

The permissible leakage oil pressure (housing pressure) is dependent on the speed.



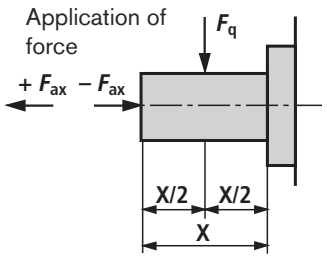
Recommended control pressure in relation to the operating pressure

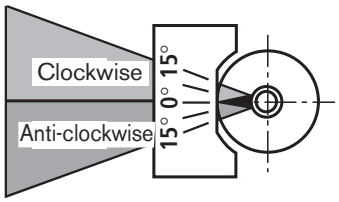


Technical data: secondary unit A4VSO

Value table (theoretical values, without taking η_{mh} and η_v into consideration; the values have been rounded)

Nom. size		NS	**40**	**71**	**125**	**180**	**250**	**355**	**500**	**750**	**1000**
Displacement volume	$V_{g\,max}$	cm^3	40	71	125	180	250	355	500	750	1000
Max. speed											
$V_g \leq 1.0\ V_{g\,max}$, $p_E \geq 15$ bar	n_{max}	RPM	3700	3200	2600	2400	2000	2000	1800	1600	1600
$V_g \leq 0.8\ V_{g\,max}$, $p_E \geq 15$ bar	n_{max}	RPM	4900	4100	3400	2900	2600	2200	2000	1800	1600
$V_g \leq 0.8\ V_{g\,max}$, $p_E \geq$ 1 bar	$n_{o\,max\,zul}$	RPM	3200	2700	2200	2100	1800[1)]	1700[1)]	1600[1)]	1450	1000
$V_g \leq 1.0\ V_{g\,max}$, $p_E \geq$ 1 bar	$n_{o\,max}$	RPM	2600	2200	1800	1800	1500[1)]	1500[1)]	1320[1)]	1200	1000
Torque at $V_{g\,max}$ and $\Delta p = 300$ bar	T	Nm	191	339	597	859	1194	1695	2387	3581	4775
Power at $V_{g\,max}$, n_{max} and $\Delta p = 300$ bar	P	kW	74	114	163	216	250	355	450	600	800
Adjustment volume (from 0 to $V_{g\,max}$)	$V_{S\,max}$	cm^3	5.9	10.5	26.0	26.0	50.9	50.9	63.8	105	129
Adjustment time (from 0 to $V_{g\,max}$)	t_S	s	0.030	0.040	0.050	0.050	0.060	0.060	0.080	0.090	0.1
Moment of inertia		kgm^2	0.0049	0.0121	0.0300	0.055	0.0959	0.19	0.3325	0.66	1.20
Minimum total moment of inertia required [2)]		kgm^2	0.025	0.06	0.15	0.27	0.48	0.95	1.66	3.33	6
Approx. weight (with RVE and incremental encoder) A4VSO-DS1		kg	65	79	122	136	218	241	373	513	642
Perm. axial force at housing pressure p_{max} 1 bar abs.	$\pm F_{ax\,max}$	N	1000	1400	1900	2250	3000	3600	4000	5450	8000
Perm. axial force at housing pressure p_{max} 4 bar abs.	$+ F_{ax\,max}$	N	620	810	1050	1400	1850	2100	2500	3150	4700
	$- F_{ax\,max}$	N	1380	1950	2750	3050	4150	5050	5500	7800	11000
Perm. radial force	$F_{q\,max}$	N	1200	1700	2500	3100	4000	4400	5000	6000	10000





[1)] High speed version (15 % higher speed) available on request

[2)] A higher moment of inertia improves the control characteristics.

Flow direction

Swivel range [3)]	Rotation direction [4)] Clockwise	Rotation direction [4)] Anti-clock-wise	Pressure in	Operating mode
Clockwise	B ⇒ S	–	B	Motor
Clockwise		S ⇒ B	B	Pump
Anti-clock	–	B ⇒ S	B	Motor
Anti-clock	S ⇒ B	–	B	Pump

[3)] Compared to the swivel angle indicator

[4)] Viewed on the shaft

Technical parameters

Flow $q_V = \dfrac{V_g \bullet n \bullet \eta_v}{1000}$ in L/min

Drive torque $T = \dfrac{1{,}59 \bullet V_g \bullet \Delta p}{100 \bullet \eta_{mh}}$ in Nm

Drive power $P = \dfrac{2\pi \bullet T \bullet n}{60000} = \dfrac{T \bullet n}{9549} = \dfrac{q_V \bullet \Delta p}{600 \bullet \eta_t}$ in kW

V_g = Geometric displacement volume in cm^3 per revolution

Δp = Pressure differential in bar

n = Speed in RPM

η_v = Volumetric efficiency

η_{mh} = Mechanical-hydraulic efficiency

η_t = Total efficiency ($\eta_t = \eta_v \bullet \eta_{mh}$)

Ordering details

	A4VSO		/	W–			13						

Pressure fluid
Mineral oil = **No code**

Axial piston unit
Swashplate design, variable = **A4VSO**
p_N = 315 bar, p_{max} = 400 bar

Nominal size
≙ displacement $V_{g\,max}$ (cm³)

40	71	125	180	250	355	500	750	1000

Control and adjustment device
Speed control, secondary controlled, with built-on servo valve = **DS1**
Speed control, secondary controlled, without servo valve = **DS1E**

Series
NS 40, 71 = **1X**
NS 125 to 1000 = **3X**

Direction of rotation
Bi-directional = **W**

Seals
NBR (nitril rubber to ISO 1629) with an FKM shaft seal ring = **P**
FKM (fluor rubber to ISO 1629) = **V**

Shaft end
Cylinderical with keyway DIN 6886 = **P**
Spined shaft DIN 5480 = **Z**

Mounting flange	40	71	125	180	250	355	500	750	1000	
ISO 4-hole	●	●	●	●	●	●	–	–	–	= **B**
ISO 8-hole	–	–	–	–	–	–	●	●	●	= **H**

Actuator connections

Pressure port	B	SAE at side, 90° offset	
Suction port	S	Metric fixing screws	= **13**

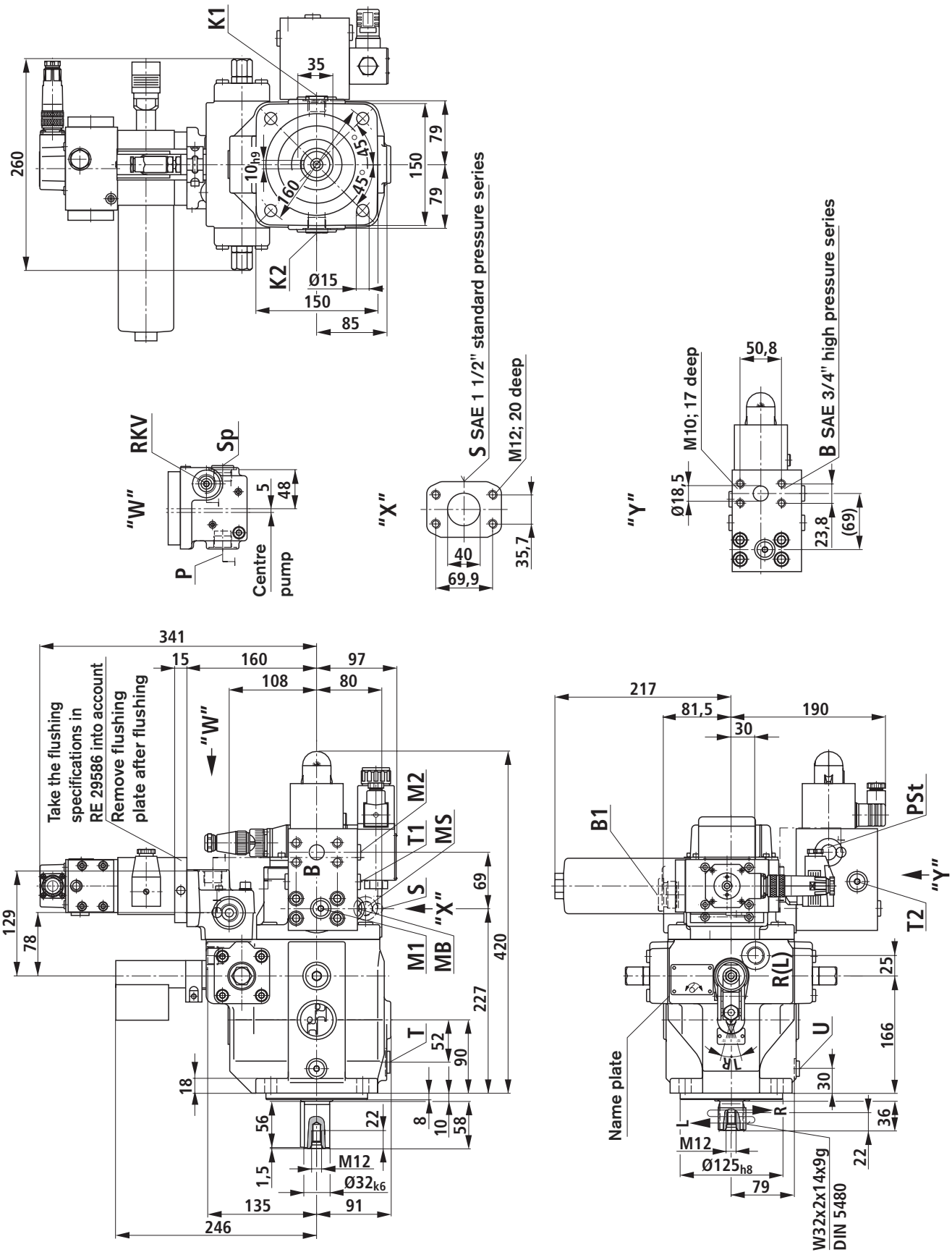
Through drive			40	71	125	180	250	355	500	750	1000	
Without auxiliary pump, without through pump			●	●	●	●	●	●	●	●	●	= **N00**
With through drive to accept an axial piston pump												
Flange	Spigot/shaft	To mount an										
ISO 125, 4-hole	Splined shaft 32x2x14x9g	A4VSO40	●	●	●	●	●	●	●	●	●	= **K31**
ISO 140, 4-hole	Splined shaft 40x2x18x9g	A4VSO71	–	●	●	●	●	●	●	●	●	= **K33**
ISO 160, 4-hole	Splined shaft 50x2x24x9g	A4VSO125	–	–	●	●	●	●	●	●	●	= **K34**
ISO 160, 4-hole	Splined shaft 50x2x24x9g	A4VSO180	–	–	–	●	●	●	●	●	●	= **K34**
ISO 224, 4-hole	Splined shaft 60x2x28x9g	A4VSO250	–	–	–	–	●	●	●	●	●	= **K35**
ISO 224, 4-hole	Splined shaft 70x3x22x9g	A4VSO355	–	–	–	–	–	●	●	●	●	= **K77**
ISO 315, 8-hole	Splined shaft 80x2x38x9g	A4VSO500	–	–	–	–	–	–	●	●	●	= **K43**
ISO 400, 8-hole	Splined shaft 90x3x28x9g	A4VSO750	–	–	–	–	–	–	–	●	–	= **K76**
ISO 250, 8-hole	Splined shaft 90x3x28x9g	A4VSO1000	–	–	–	–	–	–	–	–	●	= **K88**
With built-on incremental encoder 1000 Imp/Rev.			●	●	●	●	●	●	●	●	●	= **T03**
With built-on incremental encoder 2500 Imp/Rev.			●	●	●	●	●	●	●	●	●	= **T04**
Optional incremental encoder, through drive fitted with cover			●	●	●	●	●	●	●	●	●	= **T10**
Special tacho mount			●	●	●	●	●	●	●	●	●	= **T99**
Euro flange, through drive closed			●	●	●	●	●	●	●	●	●	= **T00**

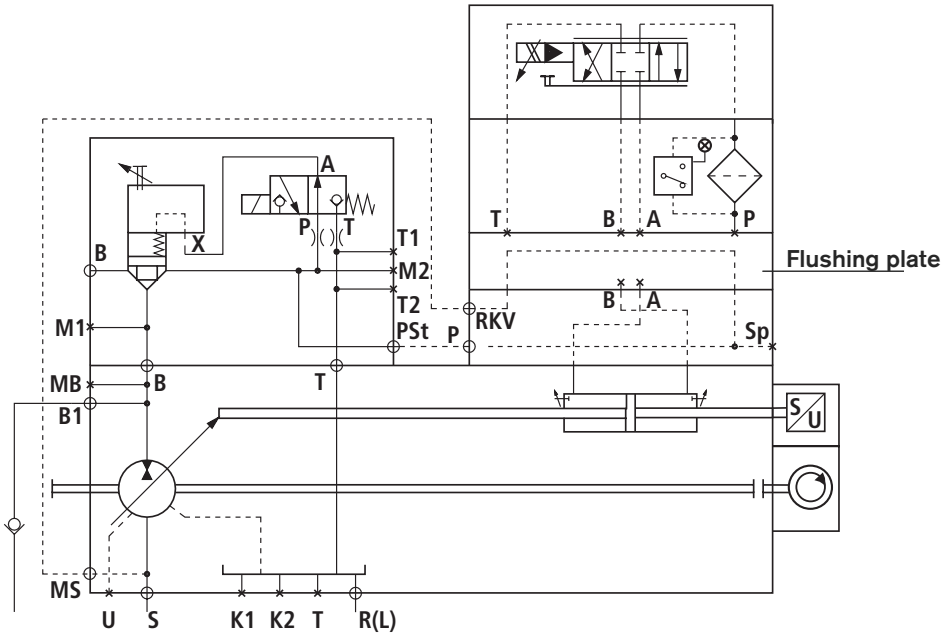
Valves
Without valve block = **0**
Built-on electrically operated check valve (isolating valve) = **1**

Filtration
Without filter = **N**
With built-on sandwich plate filter = **Z**

● = Available; – = Not available; A4VSG available on request

Unit dimensions / circuit: A4VSO40DS1/1XW–..B13T031Z (in mm)

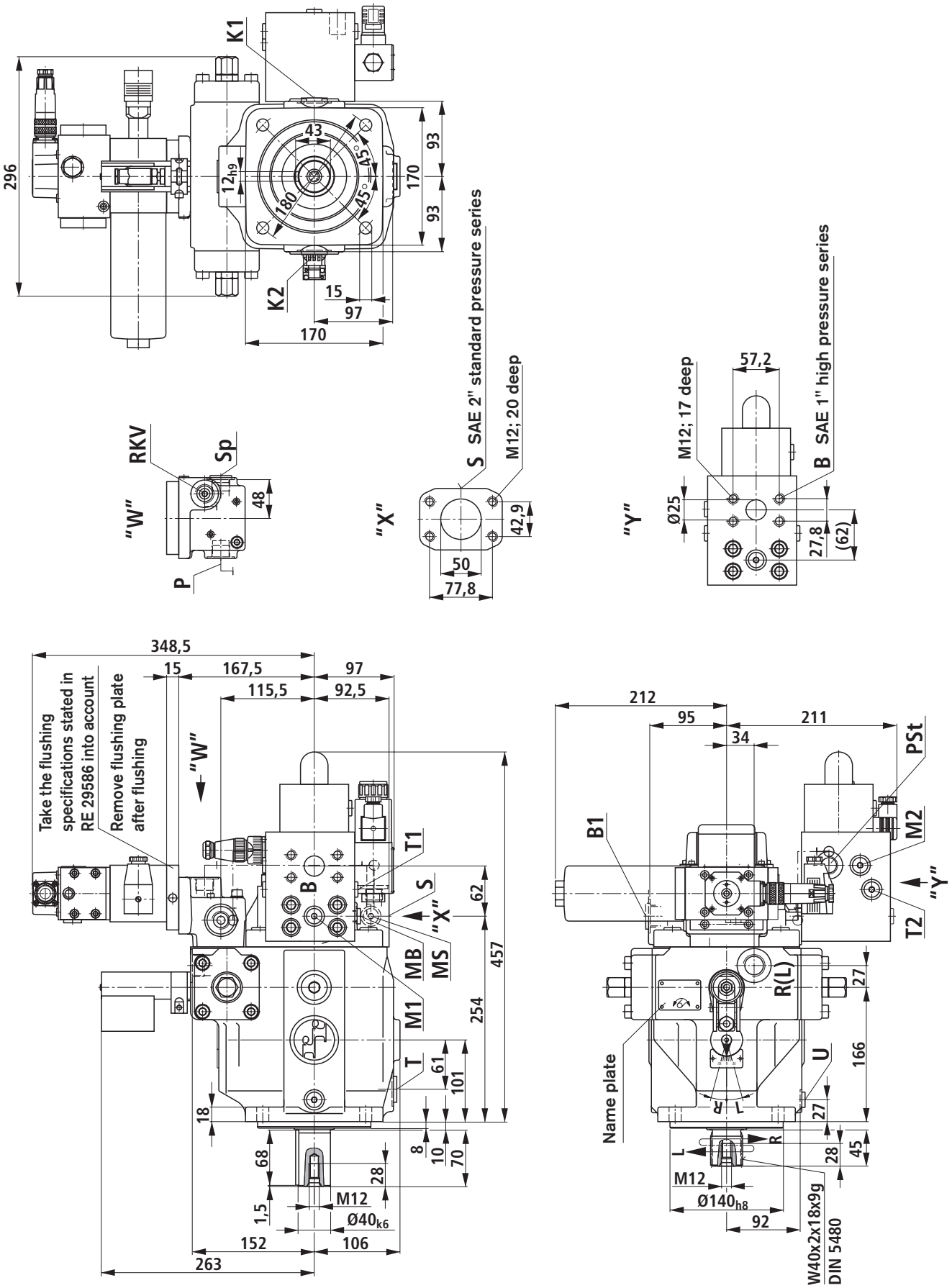


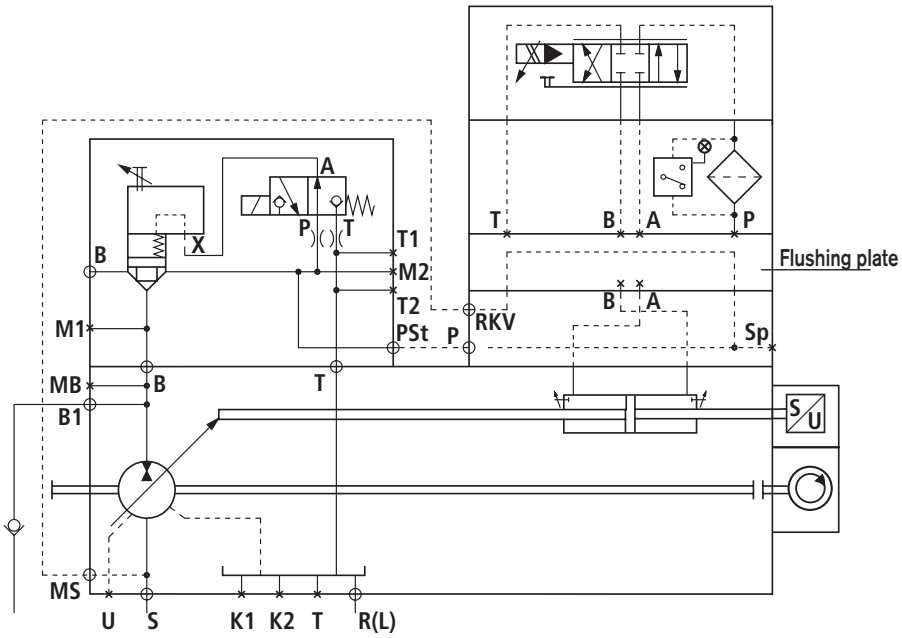


Connectionn identification:

B	= Pressure port	SAE 3/4"
B1	= Auxiliary port	M22x1,5
S	= Suction port	SAE 1 1/2"
K1, K2	= Flushing port	M22x1,5
MB	= Operating pressure test point	M14x1,5
M1, M2	= Operating pressure test point	G 1/4
Sp	= External control pressure connection	M22x1,5
R(L)	= Return	M22x1,5
T	= Oil drain	M22x1,5
T1, T2	= Leakage oil/bleeding	G 1/4
U	= Flushing connection (bearing flushing)	M14x1,5
RKV	= Control oil return (piped)	M22x1,5
MS	= Control oil return (piped)	M18x1,5
P	= Control pressure connection (piped)	M22x1,5
PSt	= Control pressure connection (piped)	G 1/2

Unit dimensions / circuit: A4VSO71DS1/1XW–..B13T031Z (in mm)

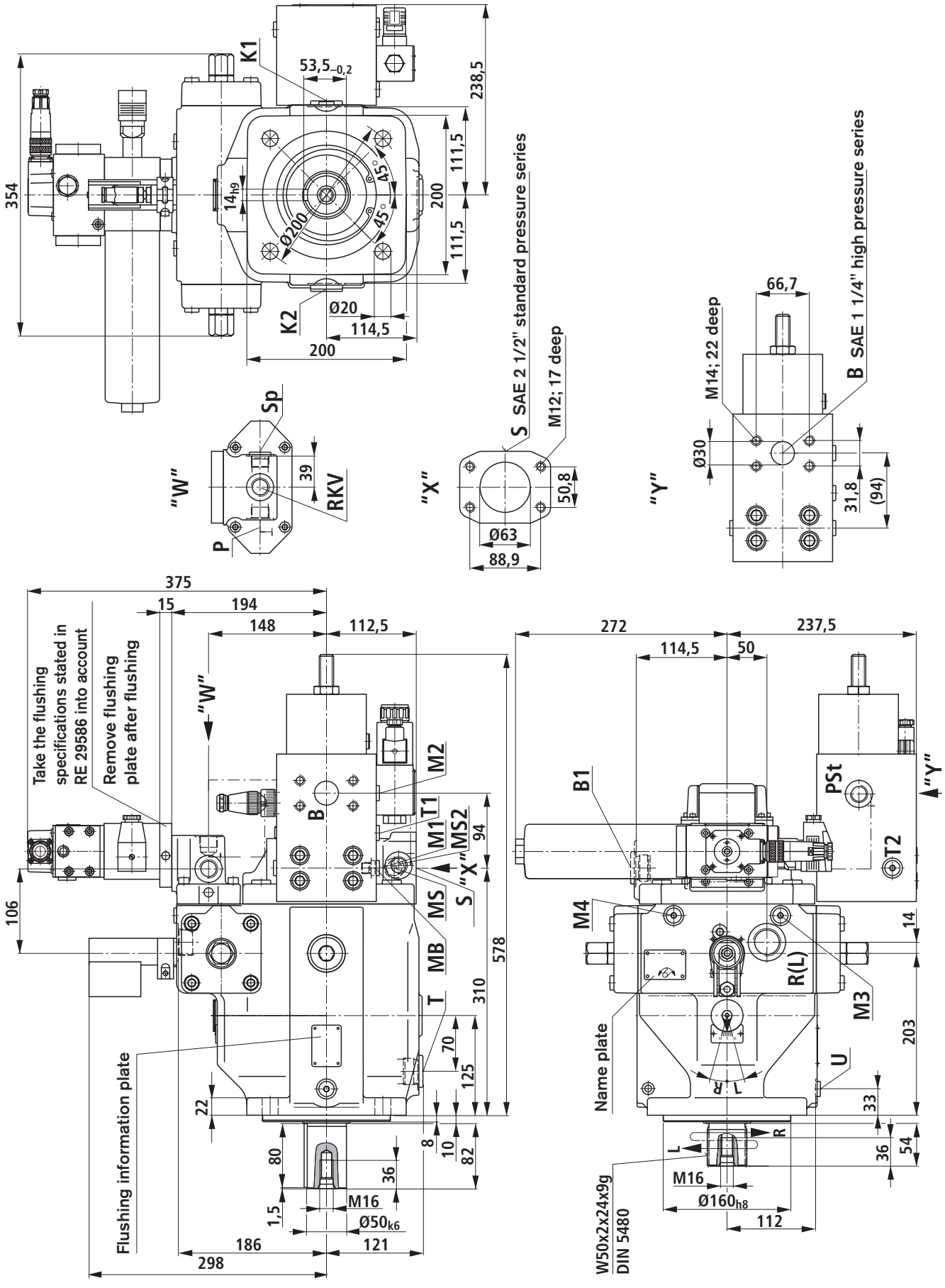


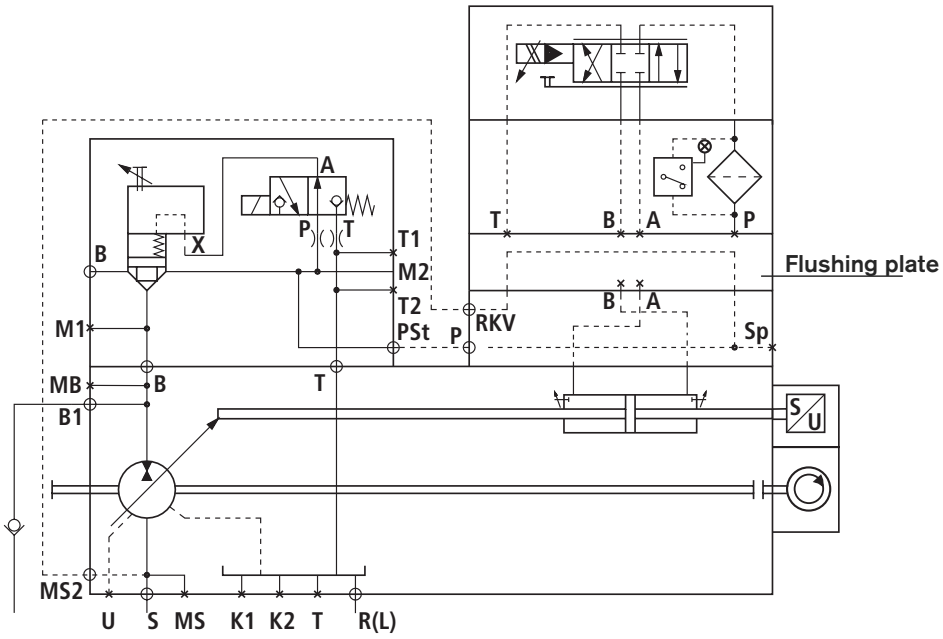


Connection identification:

B	= Pressure port	SAE 1"
B1	= Auxiliary port	M27x2
S	= Suction port	SAE 2"
K1, K2	= Flushing port	M27x2
MB	= Operating pressure test point	M14x1,5
M1, M2	= Operating pressure test point	G 1/4
Sp	= External control pressure connection	M22x1.5
R(L)	= Return	M27x2
T	= Oil drain	M27x2
T1, T2	= Leakage oil/bleeding	G 1/4
U	= Flushing connection (bearing flushing)	M14x1.5
RKV	= Control oil return (piped)	M22x1.5
MS	= Control oil return (piped)	M18x1.5
P	= Control pressure connection (piped)	M22x1.5
PSt	= Control pressure connection (piped)	G 1/2

Unit dimensions / circuit: A4VSO125DS1/3XW–..B13T031Z (in mm)

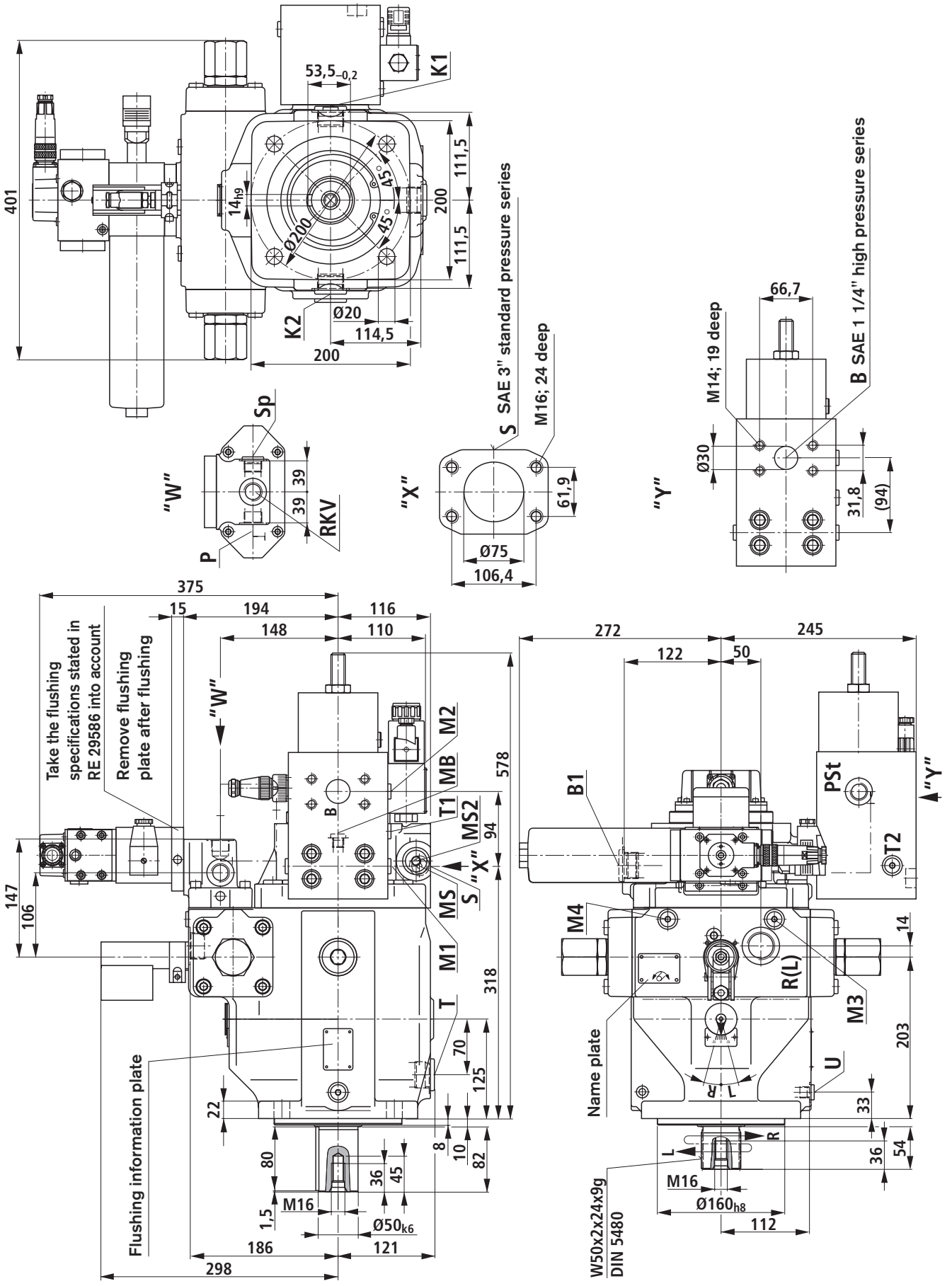


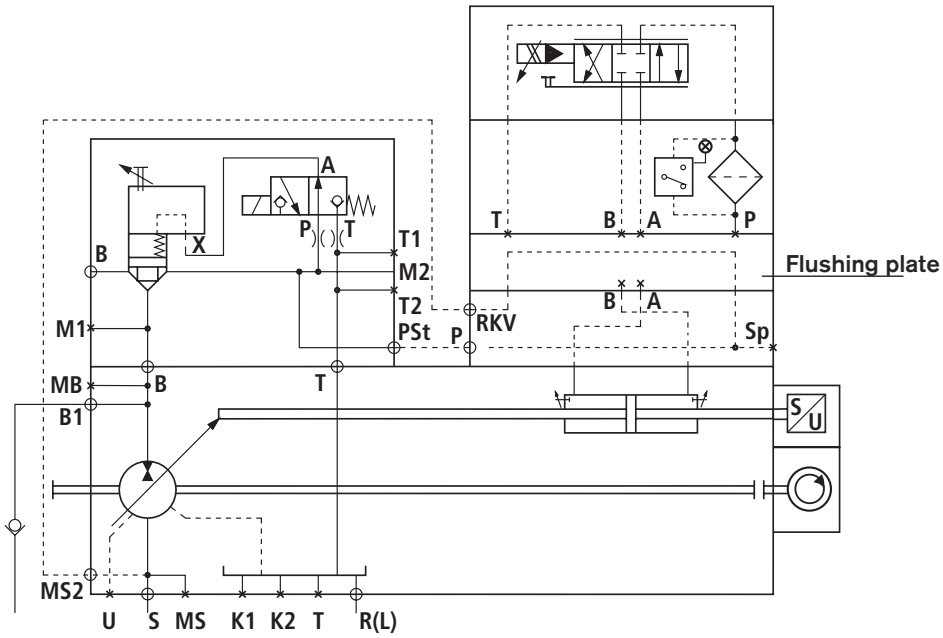


Connection identification:

B	= Pressure port	SAE 1 1/4"
B1	= Auxiliary port	M33x2
S	= Suction port	SAE 2 1/2"
K1, K2	= Flushing port	M33x2
MB	= Operating pressure test point	M14x1.5
MS	= Suction pressure test point	M14x1.5
M1, M2	= Operating pressure test point	G 1/4
M3, M4	= Control pressure test point	M14x1.5
Sp	= External control pressure connection	M22x1.5
R(L)	= Oil filing and air bleeding	M33x2
T	= Oil drain	M33x2
T1, T2	= Leakage oil/bleeding	G 1/4
U	= Flushing connection (bearing flushing)	M14x1.5
RKV	= Control oil return (piped)	M22x1.5
MS2	= Control oil return (piped)	G 1/2
P	= Control pressure connection (piped)	M22x1.5
PSt	= Control pressure connection (piped)	G 1/2

Unit dimensions / circuit: A4VSO180DS1/3XW–..B13T031Z (in mm)

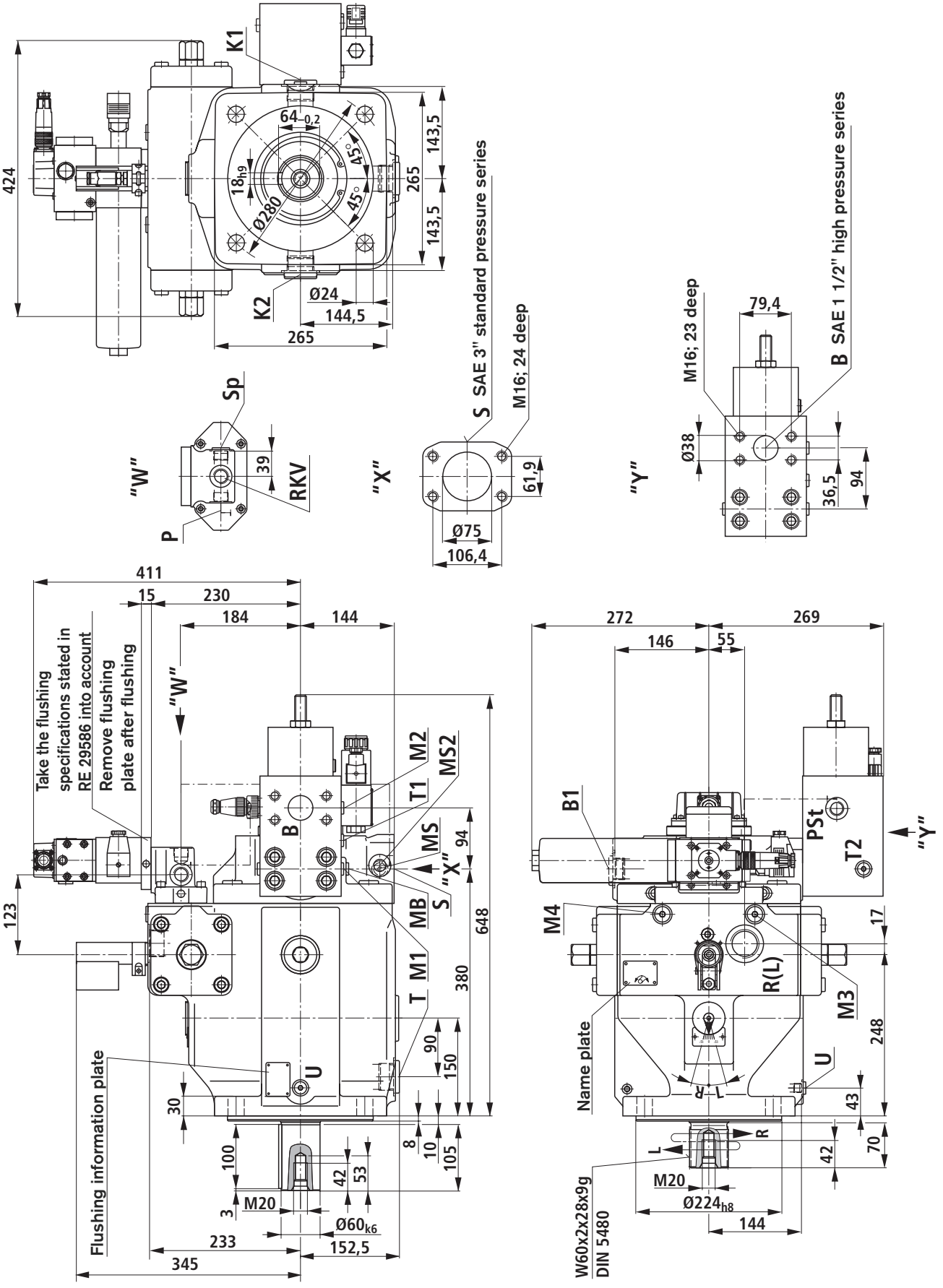


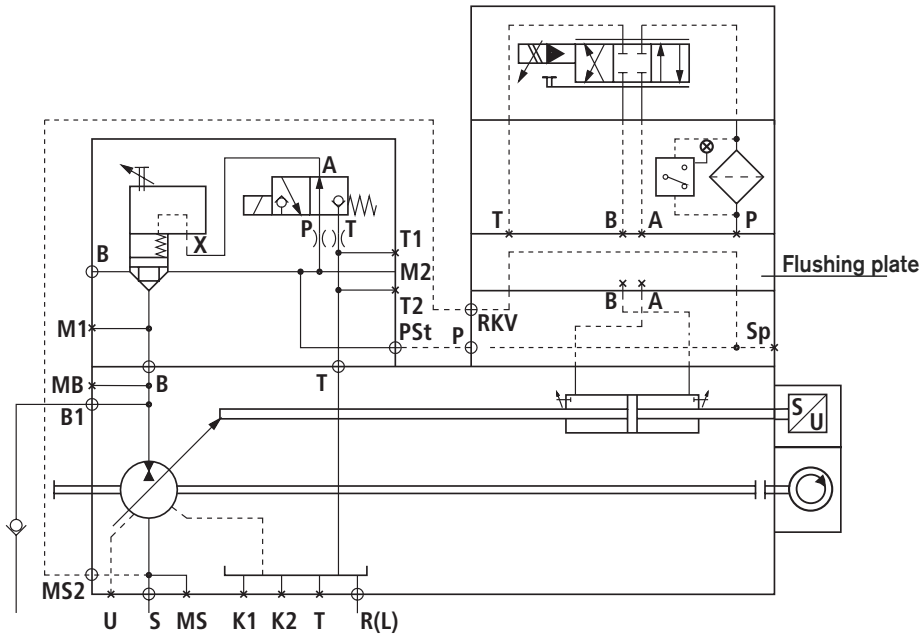


Connection identification:

B	= Pressure port	SAE 1 1/4"
B1	= Auxiliary port	M33x2
S	= Suction port	SAE 3"
K1, K2	= Flushing port	M33x2
MB	= Operating pressure test point	M14x1.5
MS	= Suction pressure test point	M14x1,5
M1, M2	= Operating pressure test point	G 1/4
M3, M4	= Control pressure test point	M14x1.5
Sp	= External control pressure connection	M22x1.5
R(L)	= Oil filling and air bleeding	M33x2
T	= Oil drain	M33x2
T1, T2	= Leakage oil/bleeding	G 1/4
U	= Flushing connection (bearing flushing)	M14x1.5
RKV	= Control oil return (piped)	M22x1.5
MS2	= Control oil return (piped)	G 1/2
P	= Control pressure connection (piped)	M22x1.5
PSt	= Control pressure connection (piped)	G 1/2

Unit dimensions / circuit: A4VSO250DS1/3XW–..B13T031Z (in mm)

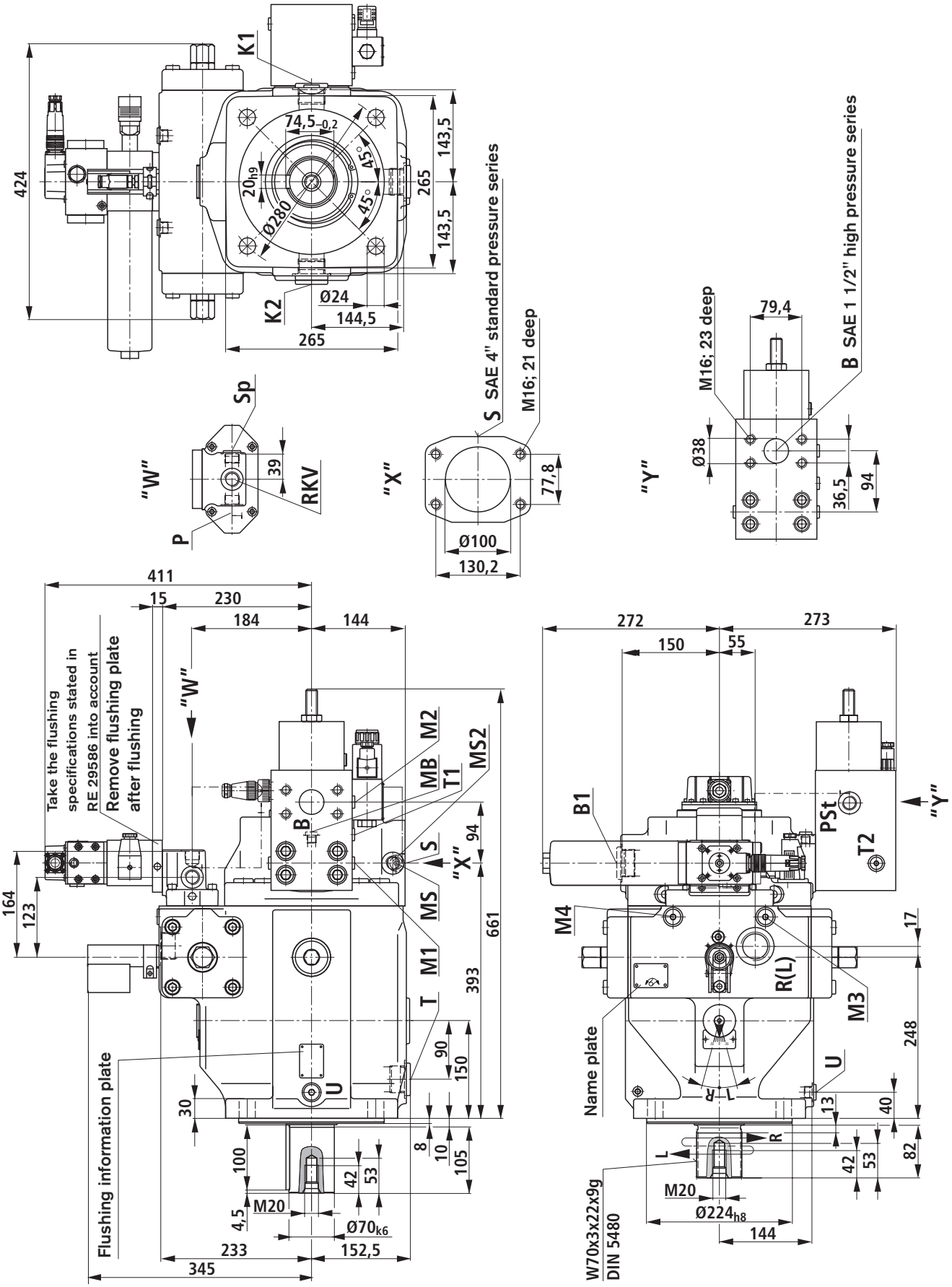


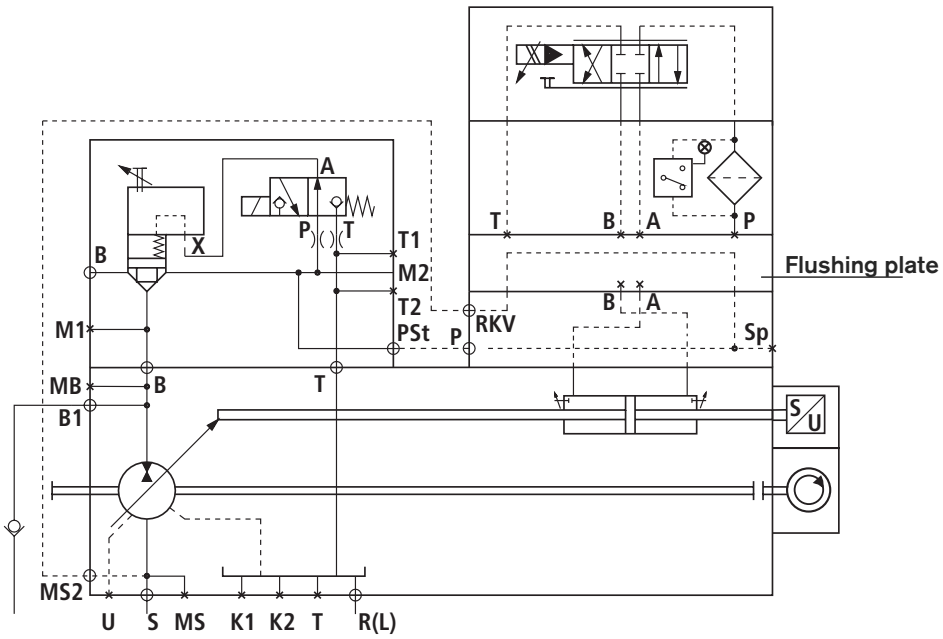


Connection identification:

B	= Pressure port	SAE 1 1/2"
B1	= Auxiliary port	M42x2
S	= Suction port	SAE 3"
K1, K2	= Flushing port	M42x2
MB	= Operating pressure test point	M14x1 .5
MS	= Suction pressure test point	M14x1 .5
M1, M2	= Operating pressure test point	G 1/4
M3, M4	= Control pressure test point	M18x1 .5
Sp	= External control pressure connection	M22x1 .5
R(L)	= Oil filling and air bleeding	M42x2
T	= Oil drain	M42x2
T1, T2	= Leakage oil/bleeding	G 1/4
U	= Flushing connection (bearing flushing)	M14x1,5
RKV	= Control oil return (piped)	M22x1,5
MS2	= Control oil return (piped)	G 1/2
P	= Control pressue connection (piped)	M22x1,5
PSt	= Control pressue connection (piped)	G 1/2

Unit dimensions / circuit: A4VSO355DS1/3XW–..B13T031Z (in mm)

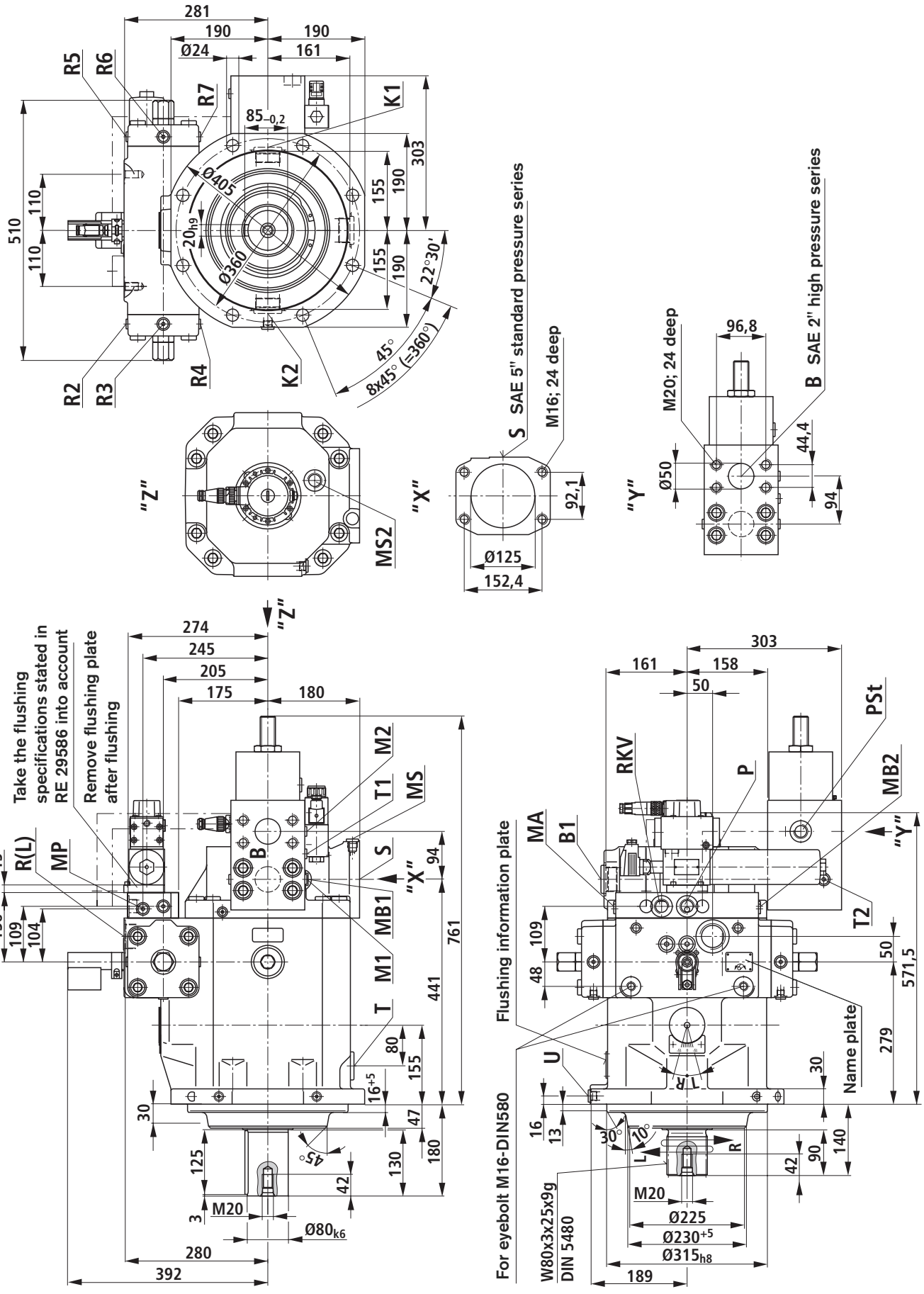


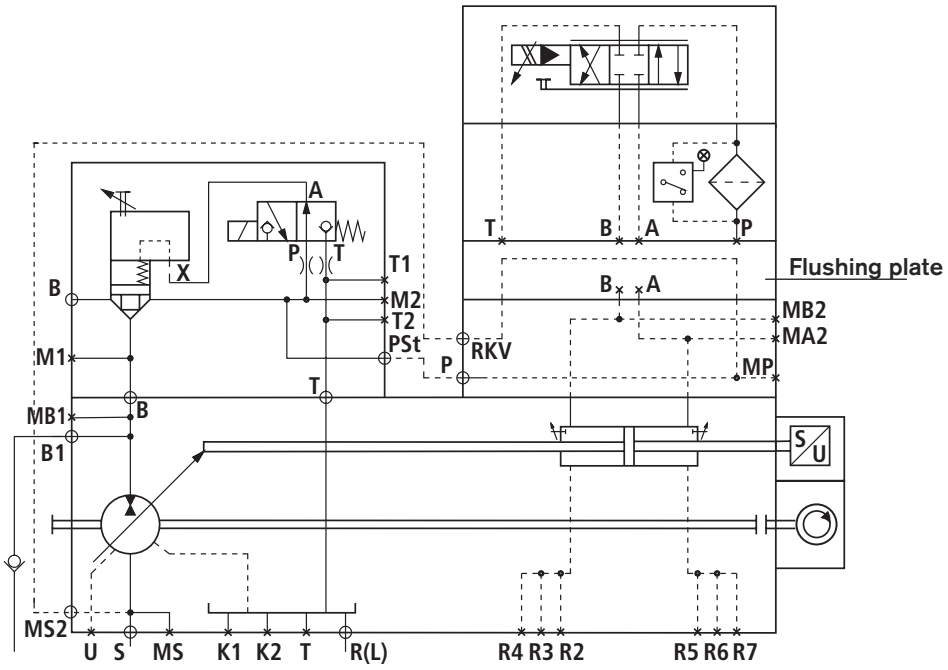


Connection identification:

B	= Pressure port	SAE 1 1/2"
B1	= Auxiliary port	M42x2
S	= Suction port	SAE 4"
K1, K2	= Flushing port	M42x2
MB	= Operating pressure test point	M14x1.5
MS	= Suction pressure test point	M14x1.5
M1, M2	= Operating pressure test point	G 1/4
M3, M4	= Control pressure test point	M18x1.5
Sp	= External control pressure connection	M22x1.5
R(L)	= Oil filling and air bleeding	M42x2
T	= Oil drain	M42x2
T1, T2	= Leakage oil/bleeding	G 1/4
U	= Flushing connection (bearing flushing)	M18x1.5
RKV	= Control oil return (piped)	M22x1.5
MS2	= Control oil return (piped)	G 1/2
P	= Control pressure connection (piped)	M22x1,5
PSt	= Control pressure connection (piped)	G 1/2

Unit dimensions / circuit: A4VSO500DS1/3XW–..H13T031Z (in mm)

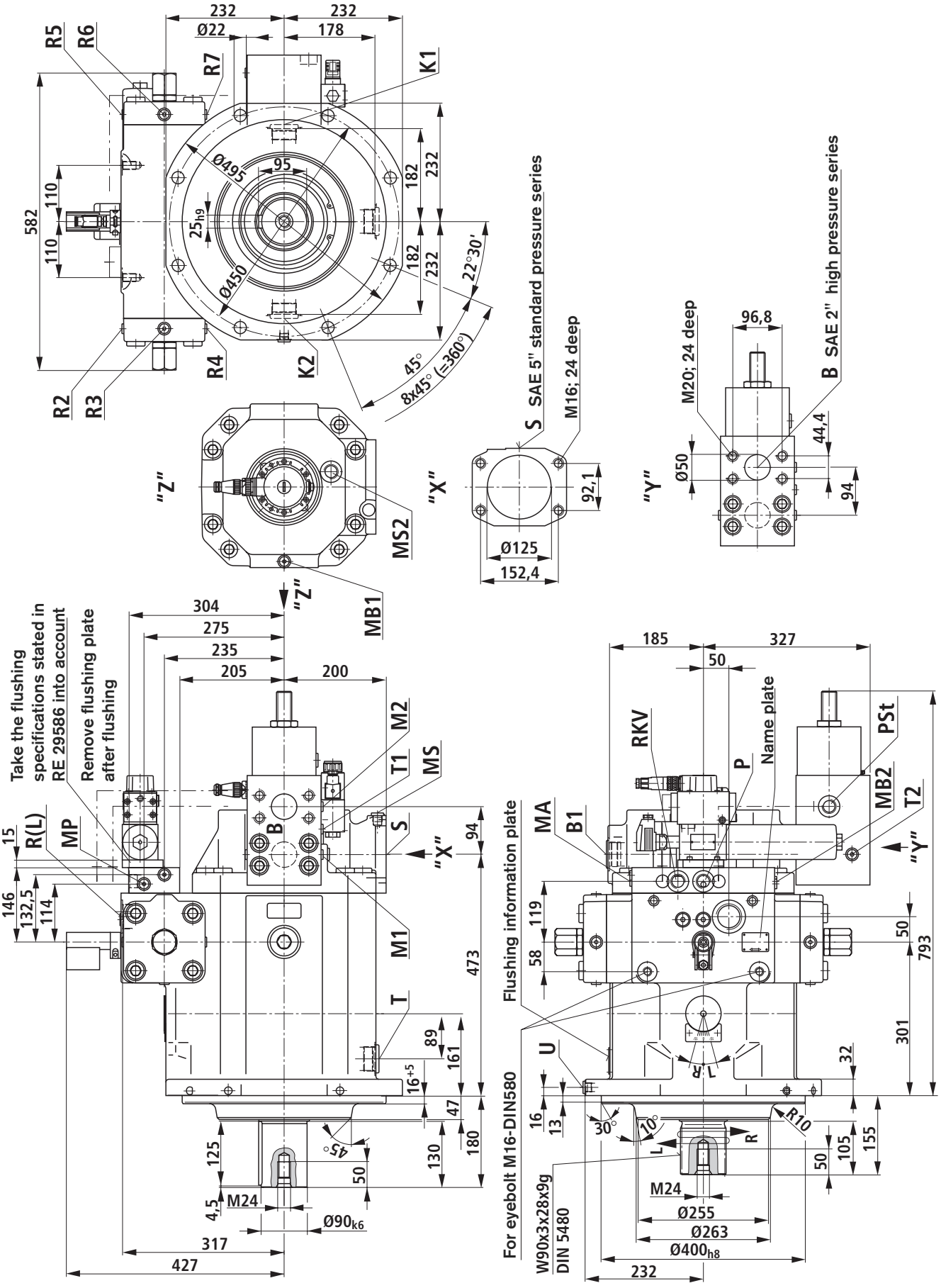


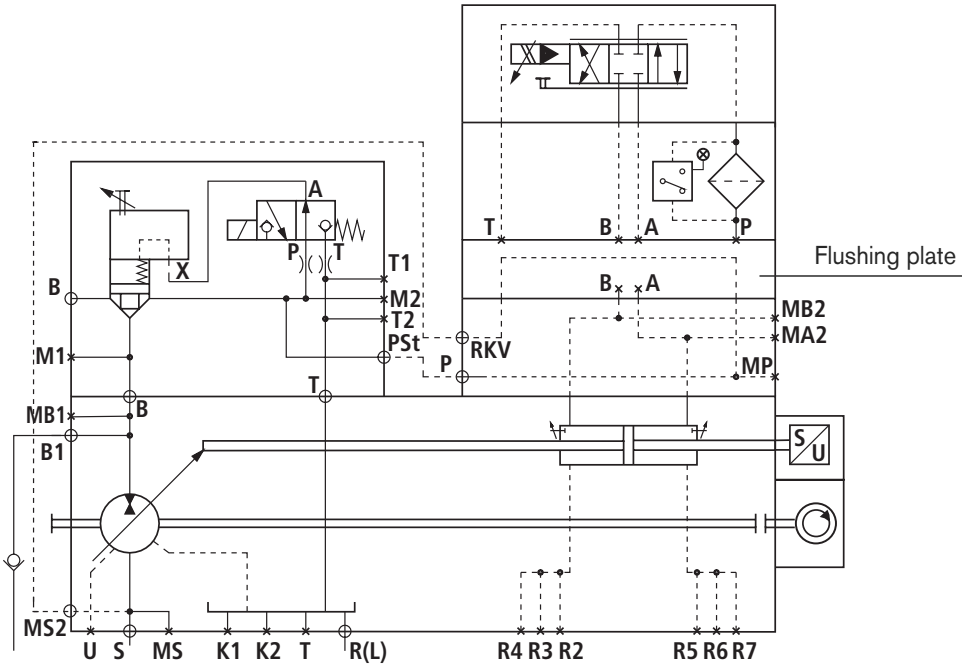


Connection identification:

B	= Pressure port	SAE 2"
B1	= Auxiliary port	M48x2
S	= Suction port	SAE 5"
K1, K2	= Flushing port	M48x2
MB1	= Operating pressure test point	M18x1.5
MA, MB2	= Control pressure test point	M14x1.5
MS	= Suction pressure test point	M18x1.5
M1, M2	= Operating pressure test point	G 1/4
MP	= External control pressure connection	M14x1.5
R(L)	= Oil filling and air bleeding	M48x2
R2-R7	= Adjustment air bleeding	M4x1.5
T	= Oil drain	M48x2
T1, T2	= Leakage oil/bleeding	G 1/4
U	= Flushing connection (bearing flushing)	M18x1.5
RKV	= Control oil return (piped)	M27x2
MS2	= Control oil return (piped)	M27x2
P	= Control pressure connection (piped)	M27x2
PSt	= Control pressure connection (piped)	G 3/4

Unit dimensions / circuit: A4VSO750DS1/3XW–..H13T031Z (in mm)

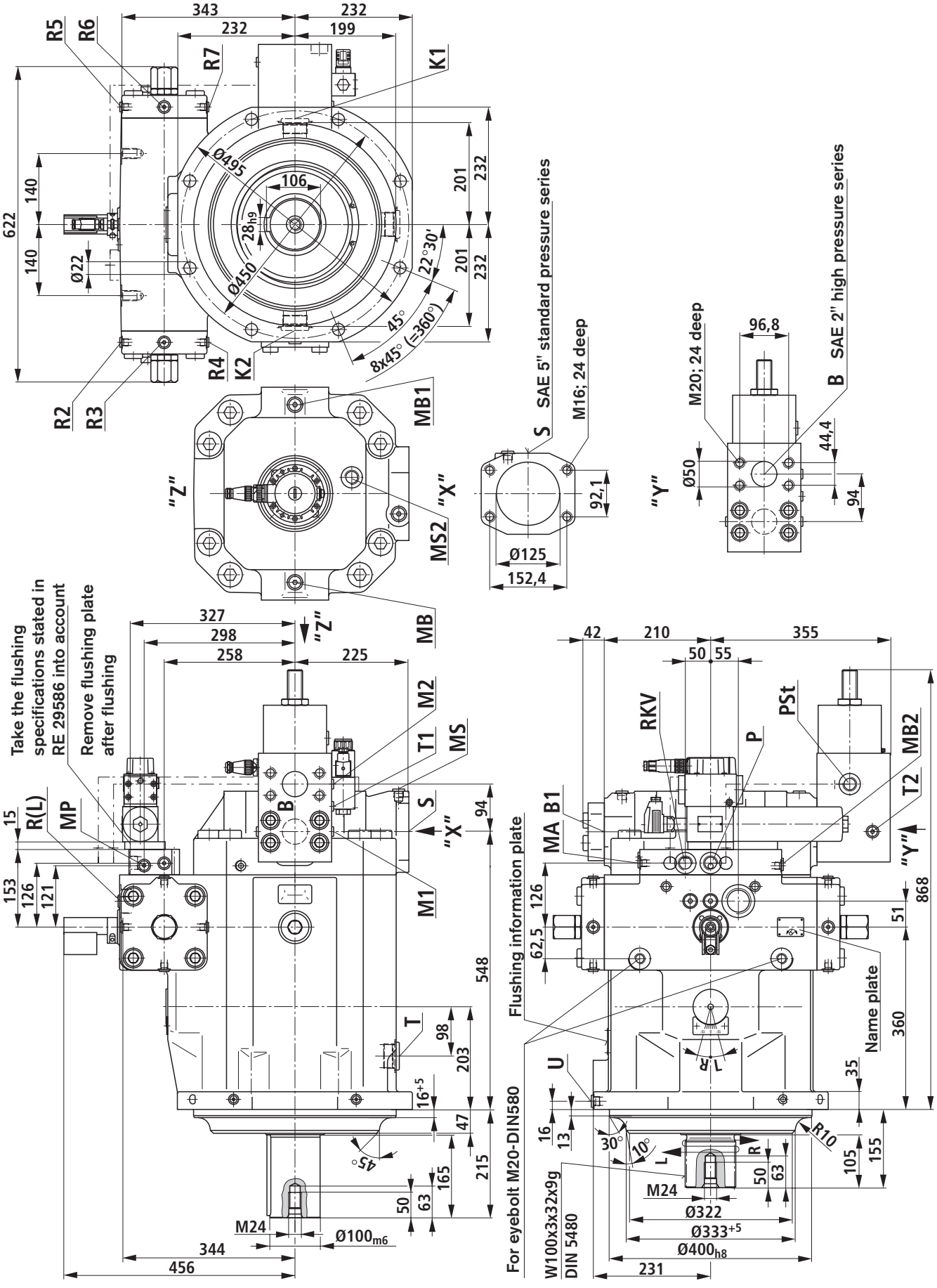


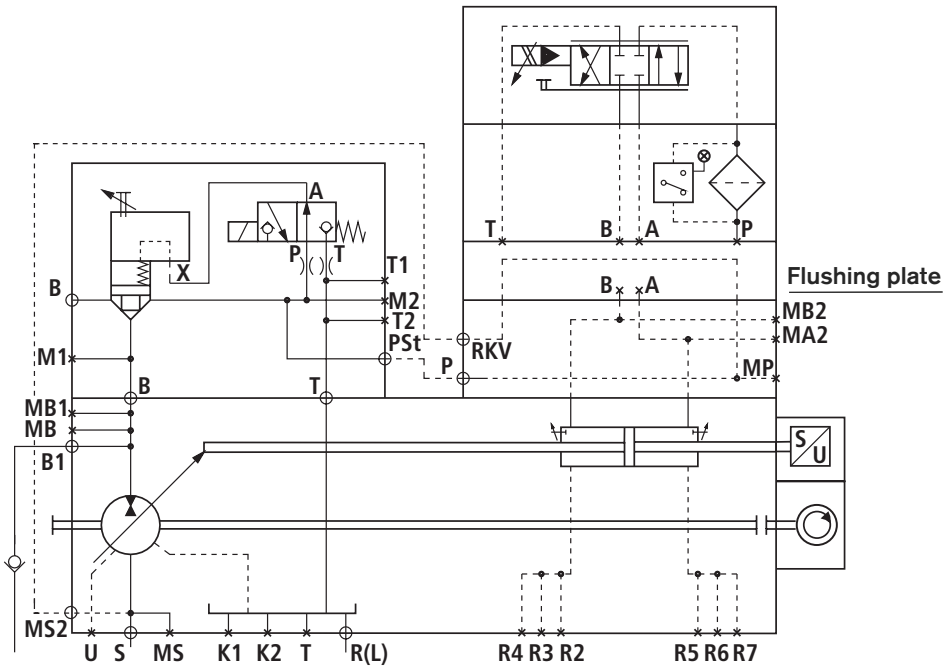


Connection identification:

B	= Pressure port	SAE 2"
B1	= Auxiliary port	M48x2
S	= Suction port	SAE 5"
K1, K2	= Flushing port	M48x2
MB1	= Operating pressure test point	M18x1,5
MA, MB2	= Control pressure test point	M14x1,5
MS	= Suction pressure test point	M18x1,5
M1, M2	= Operating pressure test point	G 1/4
MP	= External control pressure connection	M14x1 .5
R(L)	= Oil filling and air bleeding	M48x2
R2-R7	= Adjustment air bleeding	M4x1 .5
T	= Oil drain	M48x2
T1, T2	= Leakage oil/bleeding	G 1/4
U	= Flushing connection (bearing flushing)	M18x1 .5
RKV	= Control oil return (piped)	M27x2
MS2	= Control oil return (piped)	M27x2
P	= Control pressure connection (piped)	M27x2
PSt	= Control pressure connection (piped)	G 3/4

Unit dimensions / circuit: A4VSO1000DS1/3XW–..H13T031Z (in mm)





Connection identification:

B	= Pressure port	SAE 2"
B1	= Auxiliary port	M48x2
S	= Suction port	SAE 5"
K1, K2	= Flushing port	M48x2
MB, MB1	= Operating pressure test point	M18x1.5
MA, MB2	= Control pressure test point	M14x1.5
MS	= Suction pressure test point	M18x1.5
M1, M2	= Operating pressure test point	G 1/4
MP	= External control pressure connection	M14x1.5
R(L)	= Oil filling and air bleeding	M48x2
R2-R7	= Adjustment air bleeding	M4x1.5
T	= Oil drain	M48x2
T1, T2	= Leakage oil/bleeding	G 1/4
U	= Flushing connection (bearing flushing)	M18x1.5
RKV	= Control oil return (piped)	M27x2
MS2	= Control oil return (piped)	M27x2
P	= Control pressure connection (piped)	M27x2
PSt	= Control pressure connection (piped)	G 3/4

Closed loop speed control DS1

With closed loop speed control the swivel angle and thereby the stroke volume is controlled via the DS1 controller of the hydraulic unit. At a quasi-constant pressure the stroke volume is continuously adjusted to achieve the required torque to maintain the designated speed.

In a quasi-constant pressure system the torque is proportional to the swivel angle or the displacement of the axial piston unit. The swivel angle of the unit is sensed by an inductive position transducer and the actual speed value by means of an incremental rotary encoder.

Included within the scope of supply are the servo valve and the flushing plate. The guidelines stated within RE 07700 and RE 29583 are to be taken into account during commissioning. For less demanding applications, with regard to the dynamics, the drive system can be fitted with a proportional valve in place of the servo valve.

Not included within the scope of supply is the SYHNC100-SEK, to RE 30141, digital control assembly. The system is electronically monitored.

The electrically operated check valve (isolating valve), which is built onto the high pressure connection, is switched into the closed position in case of emergency. The energy supply to the secondary unit is thereby interrupted; braking in the generator mode with energy recovery to the hydraulic supply is possible.

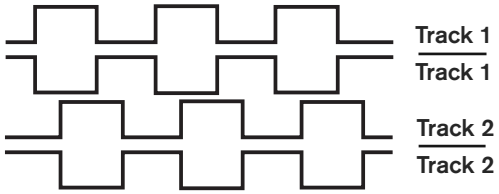
In order to prevent cavitation due to the unit running on or slowing down due to an emergency off signal anti-cavitation valves are to be provided. These must be separately ordered and mounted in the port B1 pipe work. These check valves are without a spring and have therefore to be mounted vertically.

Technical data: Incremental encoder GEL 293 (item 3); ordering details T03 or T04

Resolution:	– Ordering detail T03		1000 increments/revolution
	– Ordering detail T04		2500 increments/revolution
Protection			IP 65
Power comsumption: $R_L = \infty$; $U_B = 5$ V		W	≤ 1.0
Operating temperature range to DIN 32 876		°C	– 20 up to + 80

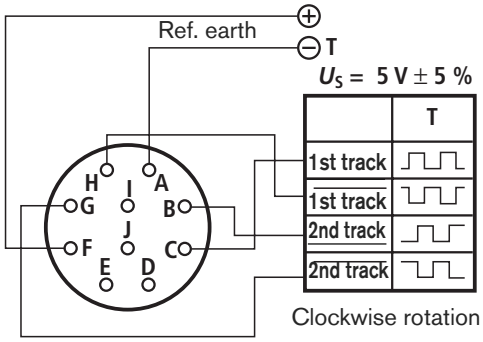
Signal pattern T

Feed voltage $U_S = 5$ V ± 5%; signal voltage $U_{Si} = 5$ V



Signal diagram, clockwise rotation viewed on the shaft!

Plug allocation (10-pin plug)

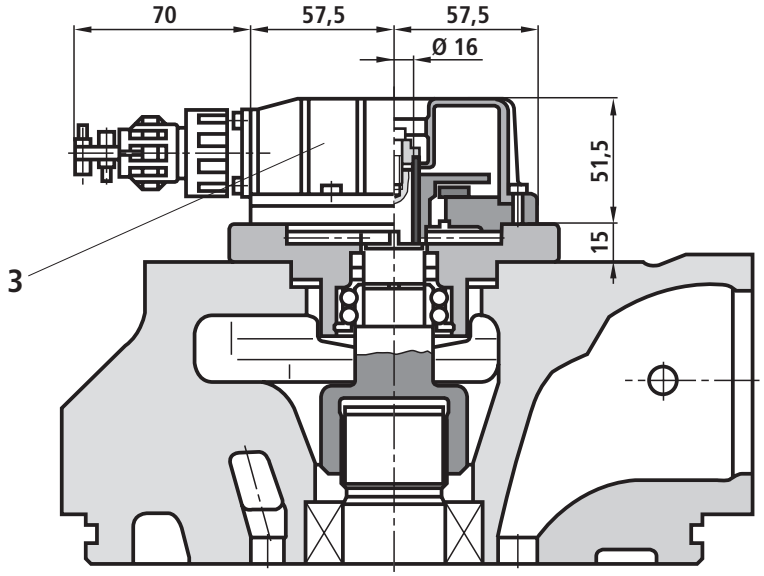


The incremental encoder is independent of the build size.

Maximum cable lengths

between encoder and interface electronics.
Earth cable shield connected on one side to the receiver. The given data are guidance values and refer to the cable type LiYCY 6 (10) x 0.25 mm².

	$U_S = 5$ V (T)					
f kHz	5	10	20	50	100	200
L_{max} ($I_a \leq 100$ mA)m	> 200	> 200	> 200	> 200	145	72



The use of the speed sensing systems is possible, in this case please consult ourselves.

Technical data: swivel angle transducer IW9-03-DT (item 1.3)

Technical data – swivel angle transducer

Measuring system				Differential throttle
Control stroke				± 4 mm
Linearity tolerance			%	≤ 1.5
Frequency carrier		*f*	kHz	5
Coil resistance (at 20 °C)	– Between ports 1 and 2		Ω	32
	– Between port 2 and ⏚		Ω	46
	– Between port 1 and ⏚		Ω	32
Electrical connection				Plug connections to DIN 43 650 - BFZ-Pg9
Plug connection protection to DIN 40 050				IP 65

Technical data: electrically operated check valve (isolating valve RVE A4VS, item 4); ordering detail 1

Electrical data (also see directional poppet valve M–3SED6, RE 22049)

DC voltage	V	24
Power consumption	W	30
Duty		Continuous
Protection to DIN 40 050		IP 65

Hydraulic data (see cartridge valve type LC.., RE 21010)

Nom. size	Logic element	Built into housing	Max. flow q_{Vmax} in L/min at a pressure drop of 5 bar
40	LC16B40D-7X/	AGEV4-05701-AB/46	200
71	LC25B40D-7X/	AGEV4-05702-AB/46	400
125	LC32B40D-7X/	AGEV4-05703-AB/46	700
180	LC32B40D-7X/	AGEV4-05703-AB/46	700
250	LC32B40D-7X/	AGEV4-05704-AB/46	700
355	LC32B40D-7X/	AGEV4-05704-AB/46	700
500	LC40B40D-7X/	AGEV4-05705-AB/46	1200
750	LC40B40D-7X/	AGEV4-05705-AB/46	1200
1000	LC40B40D-7X/	AGEV4-05705-AB/46	1200

Technical data: Anti-cavitation valve (item 5), separate order

Anti-cavitation valve (RE 20375)

Nom. size	Without boost	With boost
40	S10A0.0	S10A1.0
71	S15A0.0	S15A1.0
125	S20A0.0	S20A1.0
180	S20A0.0	S20A1.0
250	S25A0.0	S25A1.0
355	S25A0.0	S25A1.0
500	S30A0.0	S30A1.0
750	S30A0.0	S30A1.0
1000	S30A0.0	S30A1.0

Note: These anti-cavitation valves are piped to port B1.

Technical data: digital HNC100-SEK control system, separate order

The digital HNC100-SEK control system is suitable for the closed loop control of speed and torque as well as the open loop torque control of secondary controlled axial piston units type A4VS..DS1(E). The HNC100-SEK is designed for the sensing and evaluation of the swivel angle position of individual or tandem units as well as the speed sensing of incremental encoders.
The software contains closed, open loop and monitoring functions specifically laid out for secondary controls.

The following selections available as standard software:

- Version A037: closed loop speed control
  Power limitation, PID speed controller with speed dependent parameter switching, secondary PD swivel angle controller, power limitation with variable limiting value set points.
- Version A038: Master/Slave closed loop speed control
  For use when two or more secondary units are rigidly mechanically connected. Swivel angle master/slave command value set points, with adjustable torque distribution. Speed limitation of the slave drive within an adjustable tolerance band for protection if the mechanical connection fails in addition to all of the other functions of the A037 version.
- Version A039: open loop torque control.
  Converting the torque command value into a swivel angle command value taking into account the pressure and adjustable friction characteristic curves. Speed limitation via adjustable maximum values. Calculating the actual torque value as well as all of the functions of the A038 version.
- Version A040: closed loop torque control.
  PI torque controller, speed limitation via adjustable maximum values as well as all of the functions of the A039 version.

Features

- Highly dynamic rotary drive
- Compact unit for panel mounting or optionally available as a 19“ rack plug-in unit
- Parameterisation and process visualisation via a commercially available PC
- Evaluation and the monitoring of two inductive swivel angle transducers
- 4 analogue differential amplifier inputs
- 4 Impedance converter inputs
- 24 digital inputs
- 24 digital outputs
- Profibus DP and CAN-BUS, Interbus S on request
- Monitoring functions with the output of fault codes for external diagnostics
- Conformity with the relevant EC regulations, CE sign

Monitoring functions

- Minimum swivel angle value
- Minimum speed value
- Swivel angle differential
- Torque differential
- Speed differential
- Overspeed
- Maximum acceleration
- Incremental encoder cable break
- Inductive position transducer cable break

Ordering details: HNC100-SEK digital control unit

SYHNC100 – SEK – 2X / – 24 – – – E24 – *

Digital NC control HNC100

Version for secondary control **= SEK**

Series 20 to 29 **= 2X**
(20 to 29: unchanged technical data and connection allocation)

Installation type:
Housing for panel mounting **= W**
Housing for rack mounting **= M**

24 digital inputs/outputs **= 24**

Without bus connection **= 0**
Profibus DP **= P**
CAN-BUS **= C**
INTERBUS-S on request!

Further details in clear text

Standard software version:
A037 = Closed loop RPM control
A038 = Closed loop master/slave RPM control
A039 = Open loop torque control
A040 = Closed loop torque control

E24 = Hydrostatic drives

Evaluation electronics for the inductive position transducer:
0 = Without evaluation electronics
C = Evaluation electronics for position transducer type IW9, stroke 9 mm **(standard)**
On request:
Evaluation electronics for the position transducer DPH…

Ordering details for accessories:

KABELSATZ | VT 15300 – 1X / 03,0 / *

Connection cable for connecting a PC to the digital NC control HNC100-SEK

Series 10 to 19 **= 1X**
(10 to 19: unchanged technical data and connection allocation)

03,0 = Cable length in m

Further details in clear text

Software engineering

The PC programme **„WIN-PED“** is available for the user for setting and documenting the control parameters and the display of condition values on a PC.

Scope of functions:

- Dialogue window for on-line or off-line setting of the parameter values
- Comprehensive options for displaying process variables, the digital inputs, outputs and flags
- Recording and graphical representation of up to four process variables; trigger possiblities via digital switching signals as well as process variables

System requirements:

- IBM-PC or compatible system
- Windows 3.1 or Windows 95
- Processor Intel 80286 or higher (recommendation 80486 or better)
- Min. 8 MB RAM (recommendation 16 MB)
- 10 MB free hard disc space

Note:

The project data, e.g. A037 closed loop speed control, for the HNC100SEK is included within the scope of supply. It is delivered with the hardware on a CD.

The PC programme „WIN-PED“ (SYS-HNC-WINPED5-C01) is **not** included within the scope of supply. It has to be separately ordered or it can be downloaded, free of charge from the Internet!

To order a CD-ROM: Material No. **R900725471**

To download from the Internet: www.boschrexroth.de/hnc100

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