

Leak-Free Load Control Valve NS 20

$Q_{max} = 400 \text{ l/min}$, $p_{max} = 420 \text{ bar}$

Hydraulic-proportional two-stage seat valve with patented follower principle

Series CINDY-REG...



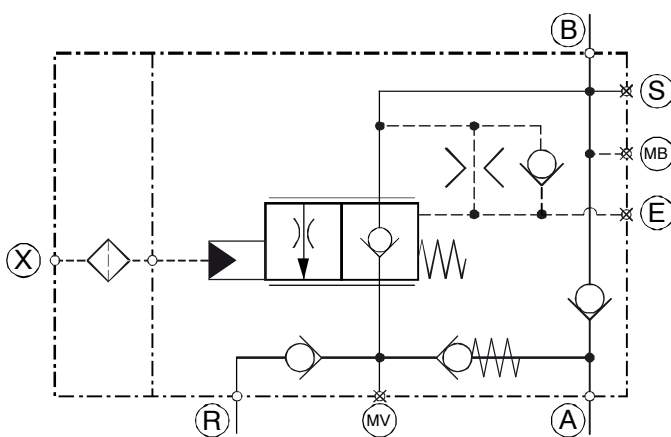
- Fulfills the safety requirements of ISO 8643 and EN 474
- Massive savings from energy regeneration right at the cylinder (no energy is used to lower the load)
- Load control and pipe-rupture protection functionally combined in one coaxial valve assembly
- No dynamic seals in the control assembly
- Pilot ratio 1:113
- Directly operated, fast-acting secondary pressure relief
- Improved efficiency, i.e. higher cycle rate

1 Description

With the CINDY-REG load-control valve, we offer the perfect solution for saving energy right at the cylinder. The safety valve with the smart regeneration concept makes it possible to reuse a part of the oil flow, which is fed directly into the opposite end of the cylinder. During lowering operations on mobile machines the pump output flow can be significantly reduced, which is important for saving energy. The unused oil goes directly to tank. Depending on the system, there is the possibility that the pump output flow that has

been saved can then be used for other functions. In addition to the main elements, such as the zero-leakage control assembly and the fast-acting, directly operated pressure relief function, the safety valve includes an integral balance valve for tandem applications. In the event of a pipe- or hose-rupture, the CINDY-REG prevents uncontrolled lowering of the actuator, in accordance with the standards ISO 8643 and EN 474.

2 Symbol



3 Technical data

General characteristics		Description, value, unit
Designation		leak-free load-control valve
Design		hydraulic-proportional two-stage seat valve with patented follower principle
Size		SAE 1" (6000 psi) – nominal size 20
Mounting method		flange mounting
Supply port	A / A1	SAE 1" 6000 psi ISO 6162-2 DN25 M12 (SAE J518 Code 62-16, M12x1.75)
Actuator port	B	SAE 1" 6000 psi ISO 6162-2 DN25 M12 (SAE J518 Code 62-16, M12x1.75)
Regeneration port	R	SAE 3/4" 6000 psi ISO 6162-2 DN19 M10 (SAE J518 Code 62-12, M10x1.5)
Compensation port	E	G 1/4", ISO 1179-1
Pilot port	X	G 1/4", ISO 1179-1
Drain port	L	G 1/4", ISO 1179-1
Accumulator port	S	G 1/4", ISO 1179-1
Measuring port	MB	G 1/4", ISO 1179-1
Measuring port	MV	M22x1.5, ISO 9974-1
Fittings (optionally)		according to ISO 8434-1
Weight		16 kg
Mounting attitude		unrestricted
Ambient temperature range		-20 °C ... +80 °C (others on application)
Surface protection		primed (grey)

Hydraulic characteristics		Description, value, unit
Maximum operating pressure		420 bar
Maximum operating pressure at the regeneration port R		350 bar
Maximum operating pressure at the pilot port X		100 bar
Maximum operating pressure at the drain port L		see chapter 7.2.2 Leakage-oil drain
Maximum flow rate		400 l/min
Secondary pressure relief		320 ... 420 bar security-sealed setting (other settings on application)
Flow direction		A → B, free flow through check valve function B → A, controlled flow
Type of operation		hydraulic-proportional
Opening pressure range		6 ... 20 bar or 6,5 ... 28 bar (is factory defined)
Pressure setting (in factory)		setting is done at 10 l/min (B → A) and 33 bar load pressure adjustability of the pilot pressure on application

Hydraulic characteristics	Description, value, unit
Opening pilot ratio	1:113
Hydraulic fluid	HL and HLP mineral oil to DIN 51 524; for other fluids, please contact BUCHER
Hydraulic fluid temperature range	-20 °C ... +80 °C
Viscosity range	10...650 mm ² /s (cSt), recommended 15...250 mm ² /s (cSt)
Minimum fluid cleanliness Cleanliness class to ISO 4406 : 1999	class 20/18/15

4 Function

4.1 Regeneration circuit

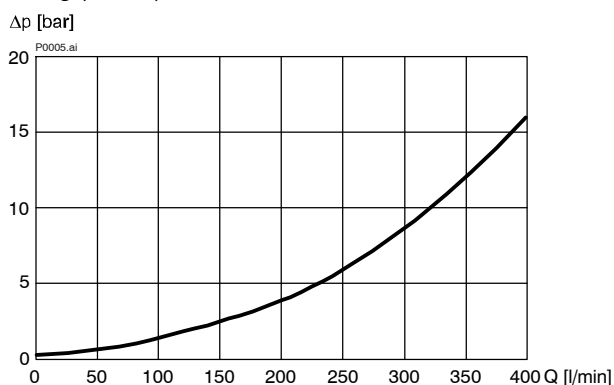
In the CINDY-REG regeneration circuit, when a differential cylinder is in-stroked the rod chamber is filled automatically. A portion of the flow leaving the full-bore end of the cylinder is channelled through a check valve into the rod chamber. The excess oil that results from the difference in areas flows through a preload valve back to tank. As well as delivering reliable load control, the CINDY-REG also enables the re-

generation function to be implemented right at the cylinder. Resulting from the area ratio of the full bore and annulus sides of the piston, the flow differential between the full bore and annulus ends is channelled to tank under preload. With this process, a pump supply to the rod end of the cylinder is avoided. The pump flow that has been saved is available to other functions.

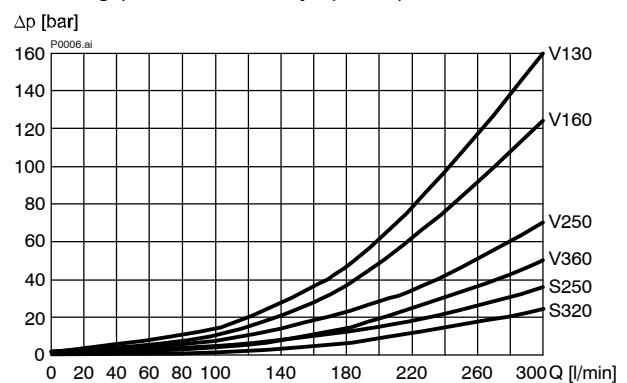
5 Performance graphs

measured with oil viscosity 33 mm²/s (cSt)

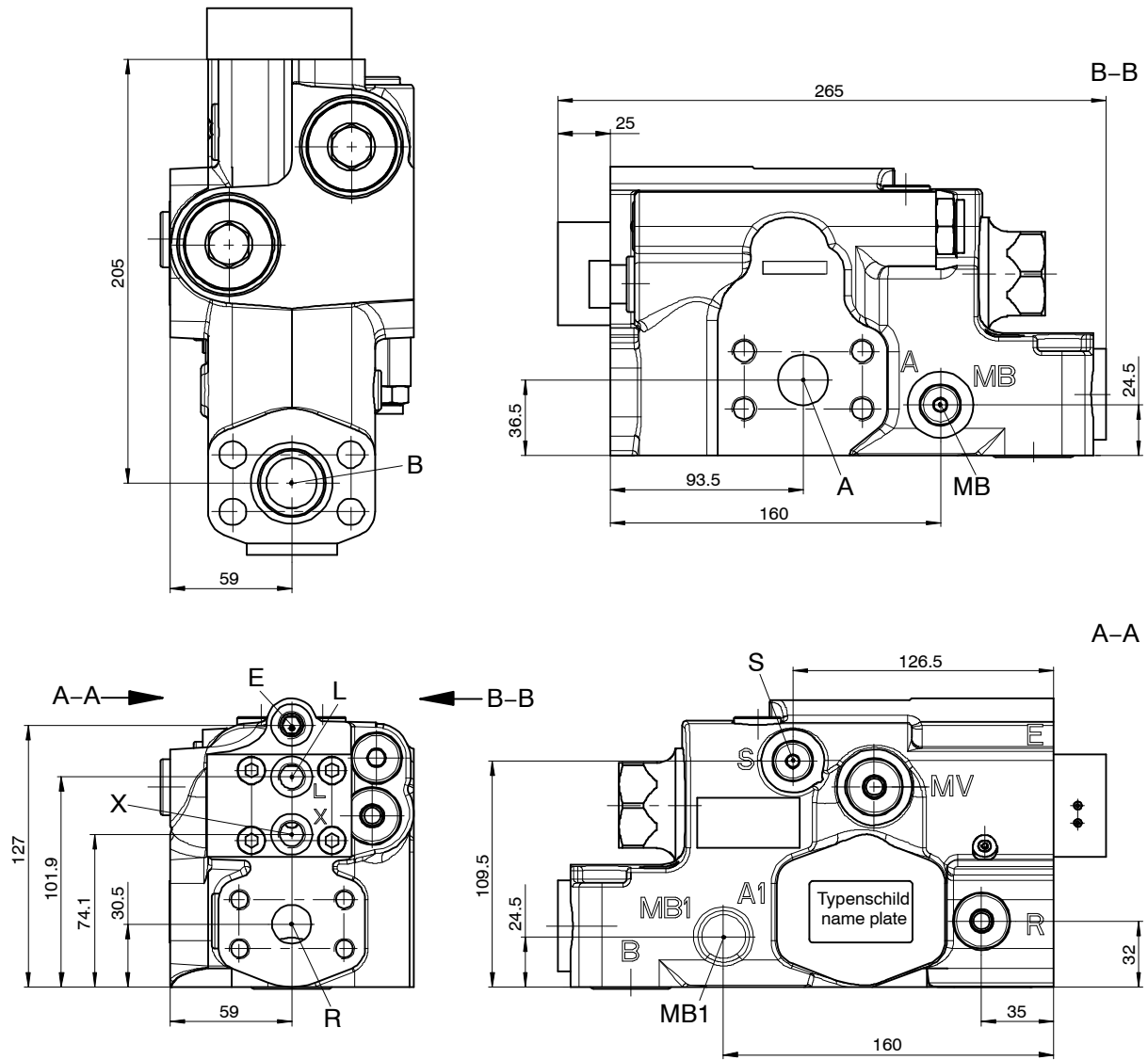
$\Delta p = f(Q)$ Pressure drop - Flow rate characteristic
Lifting (A → B)



$\Delta p = f(Q)$ Pressure drop - Flow rate characteristic
Lowering (B → A, valve fully opened)



6 Dimensions & sectional view



300-4-10023502-01

7 Installation and commissioning

7.1 Assembly / Disassembly

**ATTENTION!:**

Only qualified personnel with mechanical skills may carry out any maintenance work. Generally, the only work that should ever be undertaken is to check, and possibly replace, the seals. When changing seals, oil or grease the new seals thoroughly before fitting them.

**IMPORTANT!:**

The valve may only be used for its intended purpose within its nominal rating. If you plan to use it outside the nominal rating, you must contact the valve manufacturer.

The ultimate responsibility for safety in the installation and use rests with the end-machine manufacturer of the mobile application.

**IMPORTANT!:**

During commissioning, it is essential that all air is bled from the hydraulic system.

The port threads conform to DIN 3852 T1.

Use screws to DIN 912, grade 12.9, to mount the valve.

Pay attention to the specified tightening torques! Before fitting the valve, remove all plastic protectors and plastic residues.

**IMPORTANT!:**

Protect seals and flange faces from damage.

The mating flange face must be of the quality specified in the data sheet!

Pay attention to the port designations.

**IMPORTANT!:**

Before the valve is dismantled, make sure that all pressure has been completely discharged.

7.2 Adjustment information

7.2.1 Secondary pressure relief valve (SV)

During testing, the secondary pressure relief valve (SV) is factory-set to the pressure setting / operating pressure stipulated by the customer and then locked to prevent adjustment. The pressure is set with flow $Q = 0.75$ l/min.

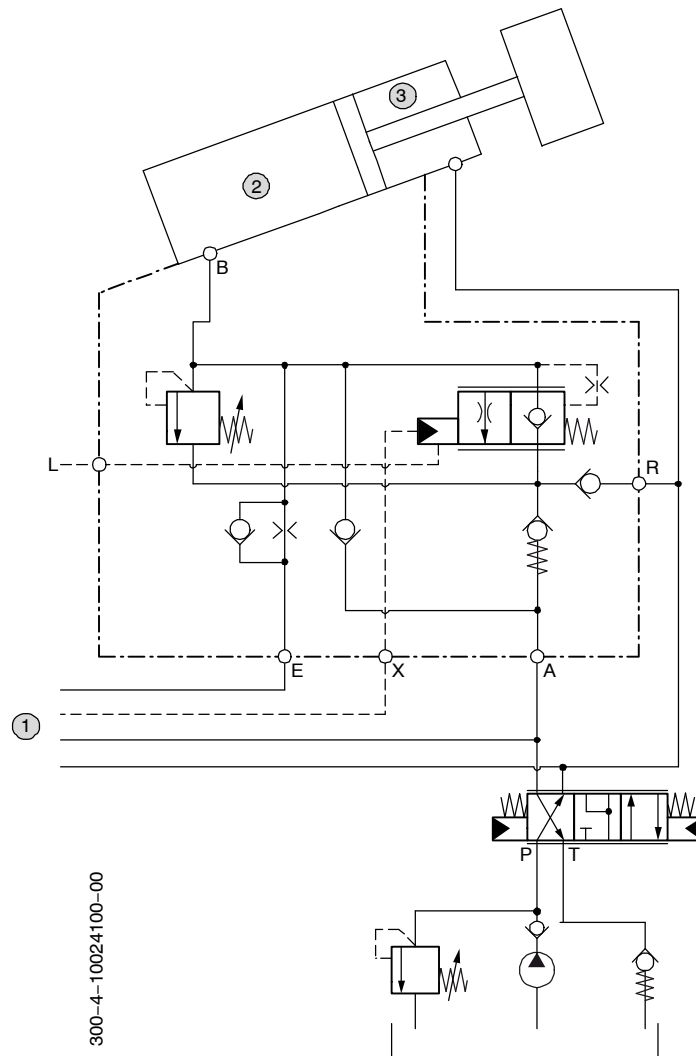
**IMPORTANT!:**

The period of warranty will be voided if the valve is worked on or tampered with!

7.2.2 Leakage-oil drain

All leakage oil is drained to port L. This port should be routed to tank with the least possible back-pressure. Any tank preload- or back-pressure in the drain line has a 1:1 effect on the opening values of the pilot valve and the pressure relief valve.

8 Application examples



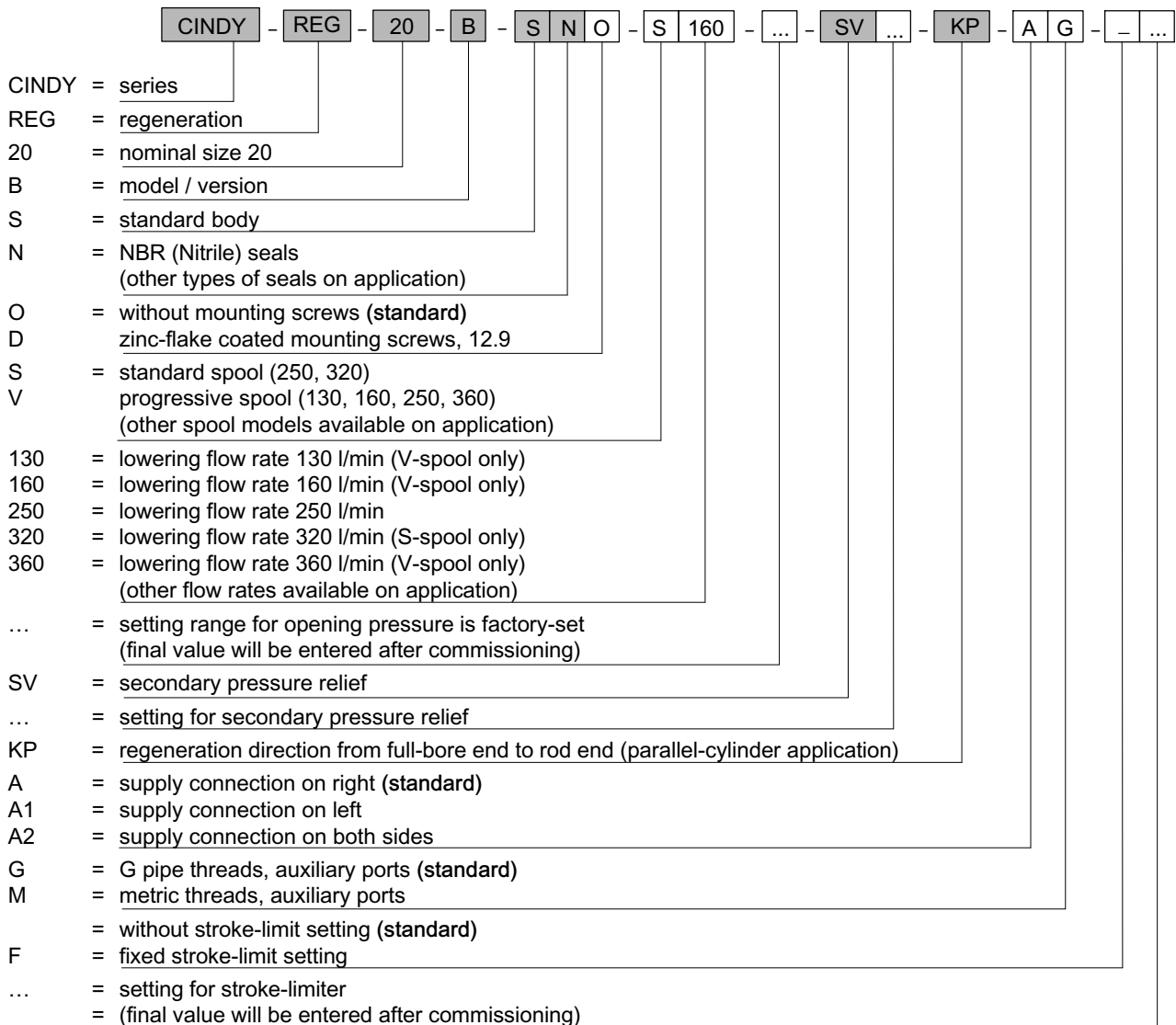
Regeneration right at the cylinder

It makes sense to use regeneration valves on materials handlers that have long cylinder strokes. This extra function is recommended on lift cylinder and stick cylinder applications.

Item	Description
1	To left cylinder (for tandem application)
2	Full-bore end
3	Rod end
P	Pump port
T	Tank port
L	Drain-line port

Item	Description
E	Balance-line port (to left cylinder, tandem application)
X	Pilot-line port (to left CINDY-REG, tandem application)
A	Supply port (to left CINDY-REG, tandem application)
R	Regeneration port
B	Actuator port

9 Ordering code



IMPORTANT!: Manual emergency release available on request



IMPORTANT!: Additional documentation and 3D models (.stp or .igs format) can be downloaded from www.bucherhydraulics.com (LOGintern area; registration is necessary)

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www.bucherhydraulics.com

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