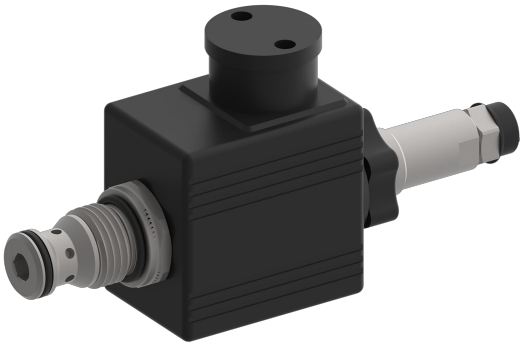
BUCHER hydraulics

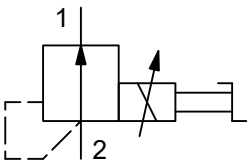
# Pressure valve
# Relief function

$Q_{max}$ = 24 l/min, $p_{max}$ = 400 bar
Direct acting, spool type, proportional solenoid with emergency override
Type series: DBDTC-1L-...



- Screw-in cartridge valve for cavity AL
- All external parts with zinc-nickel plating according to DIN EN ISO 19598
- Installation in threaded port body type GALA
- In a power failure, the pressure setting drops to the minimum value
- With integral manual pressure setting
- All common voltage types available
- High pressure wet-armature solenoids
- The slip-on coil can be rotated, and it can be replaced without opening the hydraulic envelope

## Symbol




## Description

The proportional pressure-relief valves, series DBDT_-1L..., are size 2, direct acting screw-in valves of sliding-spool design with a 3/4-16 UNF mounting thread. The relief pressure is dependent on the electrical control current and can be continuously varied. When the solenoid is de-energized (initial position), connection 2 to 1 is open and the minimum pressure (free flow) depends on the flow rate. Any pressure at port 1 is additive to the valve setting at port 2, therefore port 1 should preferably be connected directly to tank. In control mode, the relief pressure is proportional to the change in the required value (amplifier output current). If a proportional solenoid is faulty, for example, the integral manual pressure setting enables the required pressure to be set mechanically. All external parts of the screw-in valves are zinc-nickel plated and are thus suitable for use in the harshest operating environments. The slip-on coils can be replaced without opening the hydraulic envelope and can be positioned at any angle through 360°. Proportional pressure-relief valves are predominantly used in mobile and industrial applications to allow a pressure in hydraulic installations to be limited electro-proportionally. For self-assembly, please refer to the section related data sheets.

## Technical data

| General characteristics | Description, value, unit |
|---|---|
| Function group | pressure valve |
| Function | relief function |
| Design | screw-in cartridge valve |
| Controls | proportional solenoid with emergency override |
| Characteristic | direct acting, spool type |
| Construction size | NG 04 |
| Thread size | 3/4-16 UNF-2A |
| Mounting attitude | unrestricted (preferably vertical, coil down) |
| Weight | 0.54 kg |
| Cavity acc. factory standard | AL |
| Tightening torque steel | 40 Nm |
| Tightening torque aluminium | 40 Nm |
| Tightening torque tolerance | ± 10 % |
| Minimum ambient temperature | - 30 °C |
| Maximum ambient temperature | + 60 °C |
| Surface protection | all external parts with zinc-nickel plating according to DIN EN ISO 19598 |
| Sealing material | see ordering code |
| Seal kit order number | NBR: DS-284-N / FKM: DS-284-V |

| Hydraulic characteristics | Description, value, unit |
|---|---|
| Maximum operating pressure | 400 bar |
| Restriction of the operating pressure | port 1 = 250 [1]) |
| Maximum flow rate | 24 l/min |
| Restriction of the flow rate | depending on the nominal pressure stage |
| Flow direction | see symbol |
| Hydraulic fluid | HL and HLP mineral oil according to DIN 51 524;<br>other fluids on request! |
| Minimum fluid temperature | - 30 °C |
| Maximum fluid temperature | + 70 °C |
| Viscosity range | 15 ... 380 $mm^2/s$ (cSt) |
| Recommended viscosity range | 20 ... 130 $mm^2/s$ (cSt) |
| Minimum fluid cleanliness<br>(cleanliness class according to ISO 4406:1999) | class 18/16/13 |
| Nominal pressure range | nominal pressure range 025: ...25 bar<br>nominal pressure range 063: ...63 bar<br>nominal pressure range 100: ...100 bar<br>nominal pressure range 160: ...160 bar<br>nominal pressure range 230: ...230 bar<br>nominal pressure range 350: ...350 bar |
| Internal leakage flow rate | nominal pressure range 025: ...0.10 l/min<br>nominal pressure range 063: ...0.10 l/min<br>nominal pressure range 100: ...0.20 l/min<br>nominal pressure range 160: ...0.25 l/min<br>nominal pressure range 230: ...0.30 l/min<br>nominal pressure range 350: ...0.40 l/min |

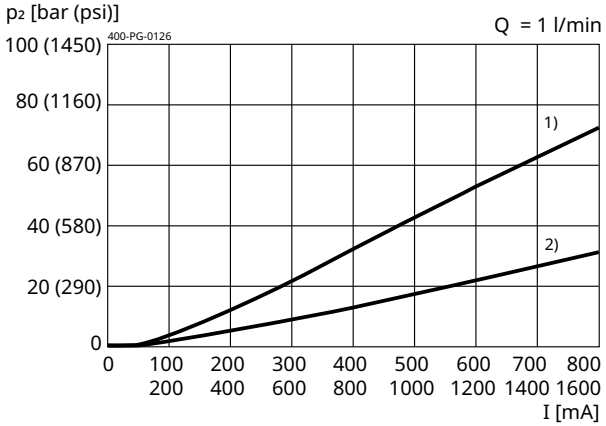
**NOTE!**
[1]) Please note that any tank or return-line pressures acting at port 1 are additive to the pressure setting at port 2.

| Electric characteristics | Description, value, unit |
|---|---|
| Actuator type | solenoid coil |
| Solenoid coils type | 36X48/16.1 |
| Supply voltage DC | 12 V DC<br>24 V DC |
| Control current | 12 V = 0...1600 mA<br>24 V = 0...800 mA |
| Nominal power consumption | 30 W |
| Switching time | 20 ... 60 ms (Solenoid ON)<br>6 ... 20 ms (Solenoid OFF)<br>These times are strongly influenced by fluid pressure, flow rate and viscosity, as well as by the dwell time under pressure |
| Relative duty cycle | 100 % |
| Coil resistance R | cold value at 20° = 12 V = 4.35 Ω / 24 V = 17.2 Ω<br>max. warm value = 12 V = 6.8 Ω / 24 V = 26.9 Ω |
| Recommended PWM frequency | 200 Hz |
| Response sensitivity with PWM | < 1 % $I_{max}$ |
| Reproducibility with PWM | < 2 % $Q_{nenn}$ |
| Hysteresis with PWM | 2...4 % $I_{max}$ |
| Reversal error with PWM | 2...4 % $I_{max}$ |
| Electrical connection coil | DIN EN 175301-803, 3-pole 2 P+E (IP 65) |
| Protection class solenoid coil to ISO 20 653 / EN 60 529 | IP 65 / IP 67 / IP 69K, see Ordering code<br>(with appropriate mating connector and proper fitting and sealing) |

## Performance graphs

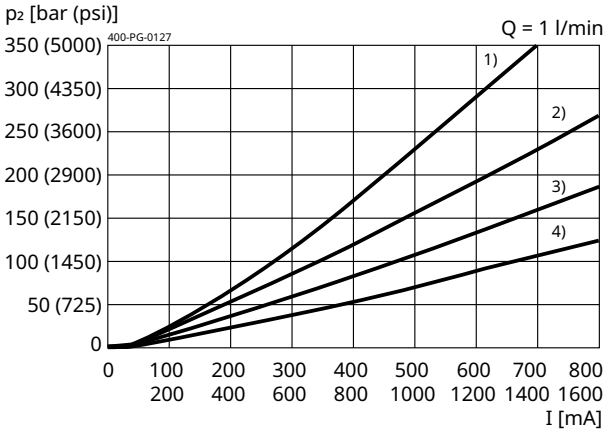
measured with oil viscosity 33.0 mm²/s (cSt)

p = f (I) Pressure adjustment



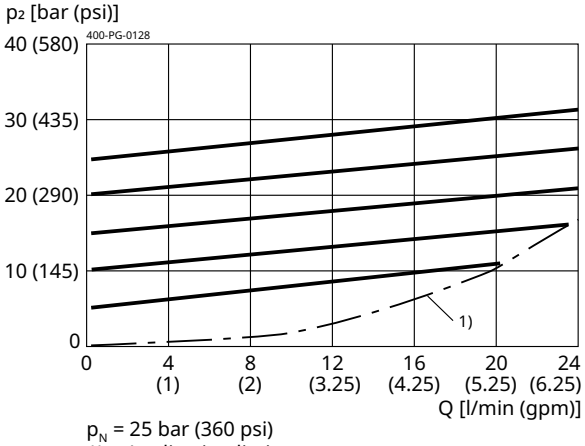

1) = $p_N$ 63 bar (915 psi)
2) = $p_N$ 25 bar (360 psi)

p = f (I) Pressure adjustment



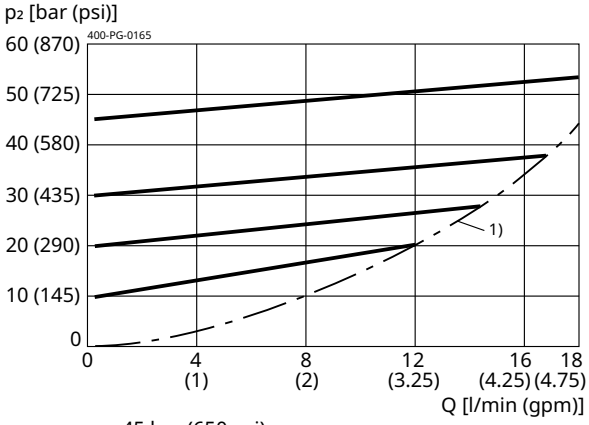

1) = $p_N$ 350 bar (5000 psi)
2) = $p_N$ 230 bar (3350 psi)
3) = $p_N$ 160 bar (2300 psi)
4) = $p_N$ 100 bar (1450 psi)

## p = f (Q) Pressure-flow rate



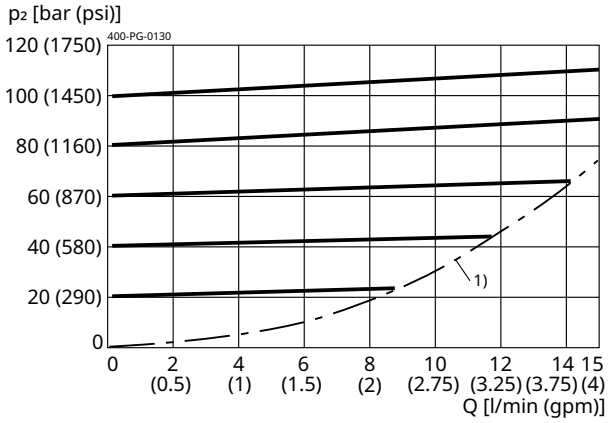

$p_N$ = 25 bar (360 psi)
1) = Application limit

## p = f (Q) Pressure-flow rate



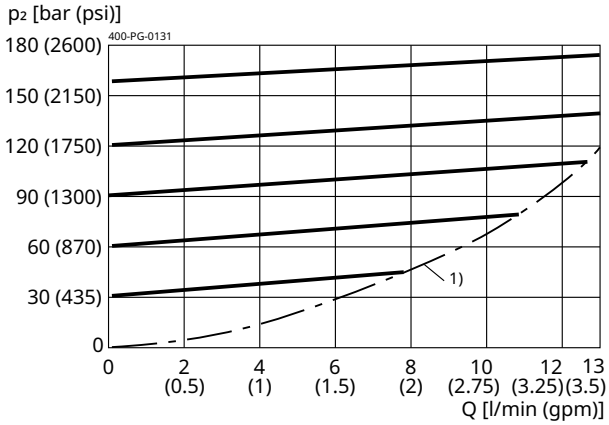

$p_N$ = 45 bar (650 psi)
1) = application limit

## p = f (Q) Pressure-flow rate



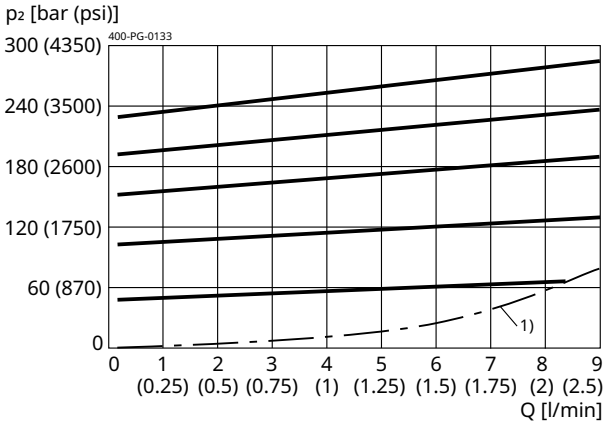

$p_N$ = 100 bar (1450 psi)
1) = Application limit

## p = f (Q) Pressure-flow rate



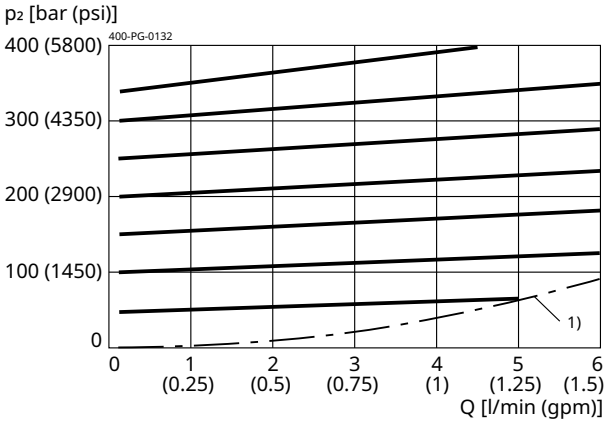

$p_N$ = 160 bar (2300 psi)
1) = Application limit

## p = f (Q) Pressure-flow rate




$p_N$ = 230 bar (3350 psi)
1) = Application limit

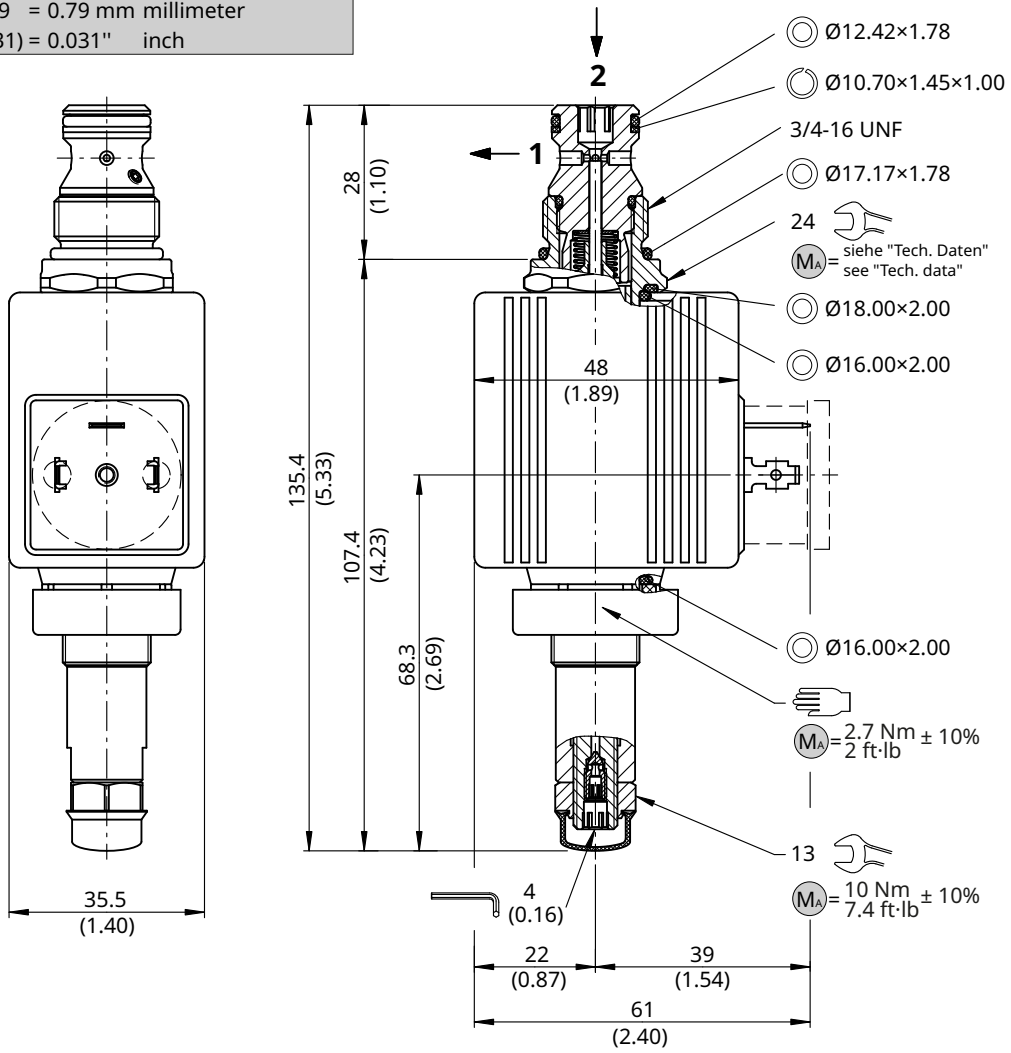
## p = f (Q) Pressure-flow rate




$p_N$ = 350 bar (5000 psi)
1) = Application limit

## Installation

**Beispiel für die Masseinheit:**
**Example for the dimensional units:**
0.79 = 0.79 mm millimeter
(.031) = 0.031" inch




**NOTE!**
- Observe tightening torques $M_A$.
- Mount the valve preferably suspended (automatic air bleed).
- The valve is factory-set, no further adjustments are necessary.

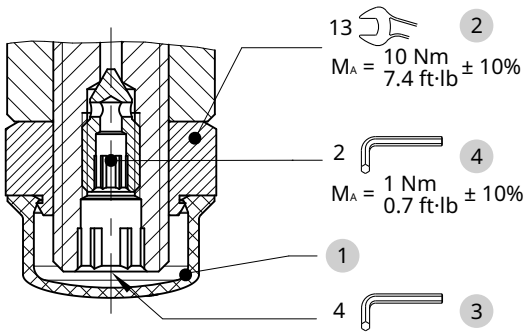
**IMPORTANT!**
Prerequisite to achieve the valve's maximum performance rating:
- the solenoid is mounted aligned as depicted.
- mounted in a steel body.

**ATTENTION!**
Only qualified personnel with mechanical skills may carry out the following work:
- installation and, if necessary, adjustment.
- replacement of slip-on solenoid coil, if present (solenoid coil type; see "Technical Data").
- inspection and, if necessary, replacement of the seals shown in the illustration. New seals must only be installed after being oiled or greased (seal kit; see "Technical Data").

**ATTENTION!**
To prevent any pressure surges, port 1 must be routed to tank with the least possible backpressure. Any tank pressure acting at port 1 is additive to the pressure setting at the main port 2.

## Emergency pressure setting

Optionally, the proportional pressure screw-in cartridge valves can be supplied with an integral manual emergency pressure setting. If a proportional solenoid is faulty, for example, this manual pressure setting enables the required pressure to be set mechanically up to max. 60% of the nominal pressure. The manual pressure setting is not designed for adjusting the pressure in a dynamic control mode. The following steps must be observed.

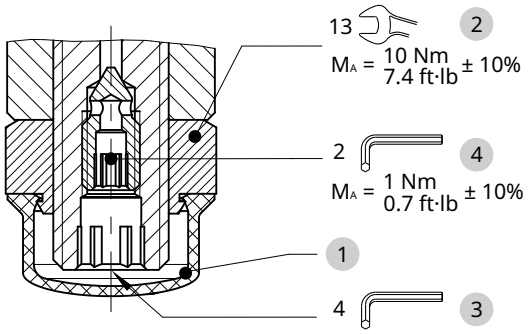



1. Remove the protective cap 1
2. Loosen the lock nut 2
3. Screw-in (turn to right) the adjusting spindle 3 until the required pressure is set.
4. Tighten the lock nut 2 to the specified torque.
5. Fit the protective cap 1

**NOTE!**
Any changes to the emergency pressure setting have a direct impact on the factory setting.

## Reset to factory settings

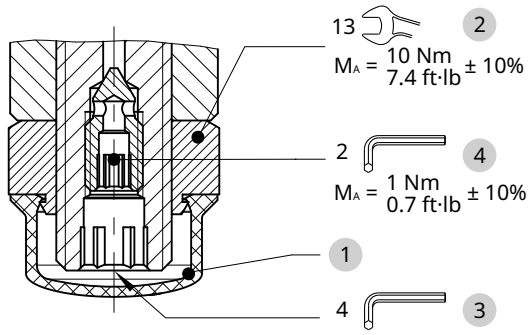
To reset the proportional pressure-relief cartridges to their initial position (the factory setting), a constant flow rate and a pressure gauge that measures the pressure in the input port are needed. The pressure setting must not exceed the nominal pressure of the spring range in use. The following steps must be observed.




1. Ensure that the solenoid coil is de-energized
2. Remove the protective cap 1
3. Loosen the lock nut 2
4. Unscrew the adjusting spindle 3 to its end-stop
5. Screw-in the adjusting spindle 3 until the pressure on the gauge reaches the nominal pressure (pN) of the spring range in use
6. Tighten the lock nut 2 to the specified torque
7. Fit the protective cap 1

## Air-bleeding

The integrated air-bleed screw allows the proportional pressure valves to be vented if necessary. If the screw-in valve is mounted as preferred (solenoid-coil hanging), it is self-venting. To vent the valve manually, follow the steps below.




1. Remove the protective cap 1
2. Loosen the air-bleed screw 4 approx. 2 turns
3. Switch the valve ON/OFF several times until no more air bubbles escape
4. Tighten the air-bleed screw 4 to the specified torque
5. Fit the protective cap 1

## Ordering code

z.B. D B D T C - 1 L - 025 - 4 _ - 1 24 D _ _

| | | | | |
|---|---|---|---|---|
| D | = | pressure-control valve | | |
| B | = | pressure-control valve | | |
| D | = | direct acting | | |
| T | = | electrically operated, COIL 36X48, proportional | | |
| C ... Q | = | standard model according to valid data sheet | | |
| Z ... R | = | special model (on request) | | |
| 1 | = | pressure relief (with internal control oil outlet) | | |
| L | = | cavity type AL | | |
| 025 | = | pressure range ... 25 bar | | |
| 063 | = | pressure range ... 63 bar | | |
| 100 | = | pressure range ... 100 bar | | |
| 160 | = | pressure range ... 160 bar | | |
| 230 | = | pressure range ... 230 bar | | |
| 350 | = | pressure range ... 350 bar | | |
| 2 | = | nominal size 2 for pressure ranges 350 and 230 | | |
| 3 | = | nominal size 3 for pressure ranges 160 and 100 | | |
| 4 | = | nominal size 4 for pressure ranges 063 and 025 | | |
| N | = | NBR (nitril-butadien-rubber / BUNA) seals **(standard)** | | |
| V | = | FKM (fluorocarbon rubber / VITON) seals (special seals on request) | | |
| 1...9 | = | technical design no. (omit by ordering) | | |
| ... | = | voltage e.g. 24 (24 V) | | |
| D | = | current DC | | |
| G | = | DIN EN 175301-803 connection | 3-pole 2 P+E **(standard)** | (IP 65) |
| GR | = | DIN EN 175301-803 connection | 3-pole 2 P+E, with protection diode | (IP 65) |
| J | = | Junior Timer plug connection | 2-pole radial | (IP 65) |
| JR | = | Junior Timer plug connection | 2-pole radial, with protection diode | (IP 65) |
| U | = | Deutsch plug connection DT04-2P | 2-pole radial | (IP 67/69K) |
| UR | = | Deutsch plug connection DT04-2P | 2-pole radial, with protection diode | (IP 67/69K) |
| | | other plug-variants, please consult BUCHER. | | |
| (blank) | = | connection without mating plug **(standard)** | | |
| Q | = | only connection “G“ and “GR“ with mating plug | | |

mating plug not supplied

**IMPORTANT!**
Not every combination of voltage values and plug connections available.

## Related data sheets

| Reference | Description |
|---|---|
| 400-P-040011 | form tools |
| 400-P-040171 | cavity AL |
| 400-P-720101 | threaded port body GALA |
| 400-P-120112 | solenoid coil Coil 36X48-161 |

**info.ch@bucherhydraulics.com** **www.bucherhydraulics.com**

© 2026 by Bucher Hydraulics AG Frutigen, 3714 Frutigen, Switzerland

All rights reserved.
Data is provided for the purpose of product description only, and must not be construed as warranted characteristics in the legal sense. The information does not relieve users from the duty of conducting their own evaluations and tests. Because the products are subject to continual improvement, we reserve the right to amend the product specifications contained in this catalogue.