

RE 29 052/02.99

Replaces: 11.97



**4/2 and 4/3 proportional directional valve
for hazard areas (explosive)
direct actuated,
without electrical feedback
type 4WRA 6...EX**

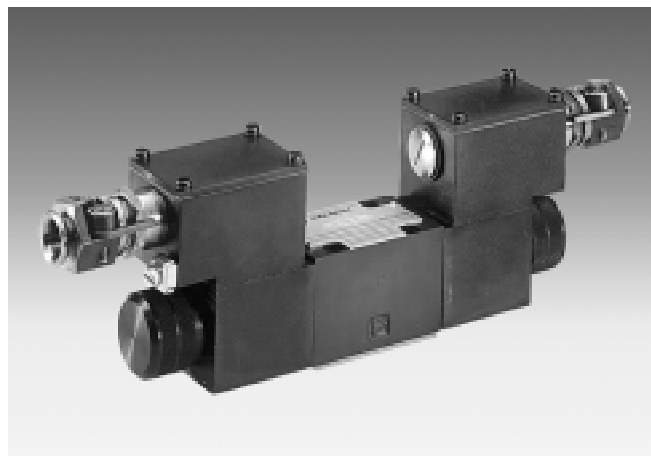
Nominal size 6

Series 2X

Maximum operating pressure 315 bar

Maximum flow 25 L/min

H/A 5294/95



Type 4WRA 6 ...-2X/G24EXJ/V

Contents

Designation

	Page
Features	1
Ordering details	2
Symbols	2
Function, section	3
Technical data	4 and 5
Control electronics	5
Electrical connections	5
Characteristic curves	5 and 6
Unit dimensions	7

Features

- Direct actuated proportional valve for the control of direction and flow
- For hazard areas (explosive)
- Actuated via a proportional solenoid with central thread and removable coil
- For sub-plate mounting:
Mounting pattern to DIN 24 340 form A,
ISO 4401 and CETOP-RP 121 H.
Sub-plates to catalogue sheet RE 45 052 (separate order), see page 7
- Spring centered control spool
- Control electronics:
Electrical amplifier VT-VSPA2-1-1X/T1-001 in
Eurocard format
(separate order), see page 5



Ordering details

4WRA

6

- 2X / G24

EX

J / V

*

Proportional directional valve
for external control electronics

Nominal size 6 = 6

Symbol

= E

E1-

= W

W1-

= EA

WA

With symbols E1 and W1-:

$P \rightarrow A: q_{V \max}$

$B \rightarrow T: q_V/2$

$P \rightarrow B: q_V/2$

$A \rightarrow T: q_{V \max}$

Note:

With the spools W and WA there is a flow from A to T and B to T with approx. 3 % of the appropriate nominal cross-section in the zero position.

Further details
in clear text

V =

FKM seals,
suitable for mineral oils
(HL, HLP) to DIN 51 524

J =

Sea water resistant

EX =

Explosion protected

G24 =

Supply voltage 24 VDC

2X =

Series 20 to 29
(20 to 29: unchanged installation and connection dimensions)

Nominal flow at a 10 bar valve pressure differential

07 =

6 L/min

15 =

10 L/min

30 =

18 L/min

Symbols

Type 4WRA 6...EX...

Type 4WRA 6...A...EX...

4WRA 6...EX

2/8

Rexroth Hydraulics

Function, section

The 4/2 and 4/3 proportional directional valves are designed as direct operated units for sub-plate mounting. They are actuated via proportional solenoids with central thread and removable coil. The control of the solenoids is by means of external control electronics.

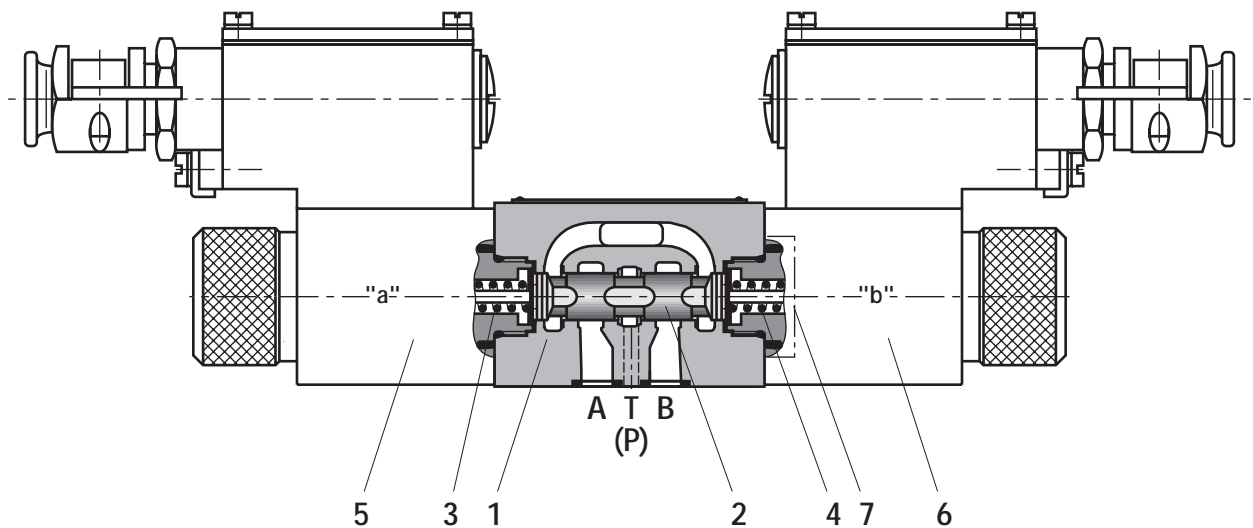
Structure:

The valve basically consists of:

- Housing (1) with connection surface
- Control spool (2) with compression springs (3 and 4)
- Solenoids (5 and 6) with central thread

Functional description:

- With solenoids (5 and 6) de-energised, the control spool (2) is held in the centre position by compression springs (3 and 4)
- Direct operation of the control spool (2) by energising a proportional solenoid
e.g. control solenoid "b" (6)
 - Moving of control spool (2) to the left proportionally to the electric input signal
 - Connection of P to A and B to T via orifice-like cross-sections with progressive flow characteristics
- De-energising of solenoid (6) → control spool (2) is returned to the centre position by compression spring (3)



Type 4WRA 6 ...-2X/G24.EXJ/V

Valve with 2 switching positions:

(types 4WRA 6.A...EX..)

The function of this valve type is principally the same as with the valve with 3 switching positions. However, the 2 switching position valves are only equipped with solenoid "a" (5). Instead of the 2nd proportional solenoid there is a plug (7).



Note:

Emptying of the tank line is to be avoided. With appropriate installation conditions a back pressure valve is to be installed (back pressure approx. 2 bar).

Technical data (for applications outside these parameters, please consult us!)**General**

Installation position		optional, preferably horizontal
Storage temperature range	°C	– 20 to + 80
Ambient temperature range	for temperature class T5 °C	– 20 to + 50
	for temperature class T4 °C	– 20 to + 80
Weight	kg	3.5

Hydraulic (measured at $v = 46 \text{ mm}^2/\text{s}$ and $\vartheta = 40 \text{ °C}$)

Operating pressure	Ports A, B, P, T	bar	up to 315
Nominal flow $q_{V \text{ nom}}$ at $\Delta p = 10 \text{ bar}$		L/min L/min L/min	6 10 18
Flow, max. permissible		L/min	25 (45 with double flow)
Pressure fluid			Mineral oils (HL, HLP) to DIN 51 524 Further pressure fluids on request!
Pressure fluid	for temperature class T5	°C	– 20 to + 50
temperature range	for temperature class T4	°C	– 20 to + 70
Viscosity range		mm^2/s	15 to 380
Degree of contamination			Maximum permissible degree of contamination of pressure fluid to NAS 1638 class 9
			A filter with a minimum retention rate of $\beta_x \geq 75$ is recommended x = 10
Hysteresis		%	≤ 5
Reversal span		%	≤ 1
Response sensitivity		%	≤ 0.5
Frequency response (– 90°, signal 50 % + 40 %)		Hz	15

Electrical

Solenoid coil	type	GZ 45-2-A EX 9 Ohm
Voltage type		direct voltage
Max. current per solenoid	for temperature class T5	A 1.11
	for temperature class T4	A 1.03
Solenoid coil	cold value at 20 °C	Ω 9
resistance	max. warm value for temperature class T5	Ω 12.16
	for temperature class T4	Ω 13.09
Duty cycle	%	100
Protection to DIN EN 50 014 ff <i>pressure fluid for hazard areas (explosive)</i>		EEx em II T4 EEx em II T5 (for low ambient temperatures)
Electrical connection		cable connection Pg 13.5 for a cable dia. of 9 to 13.5 mm

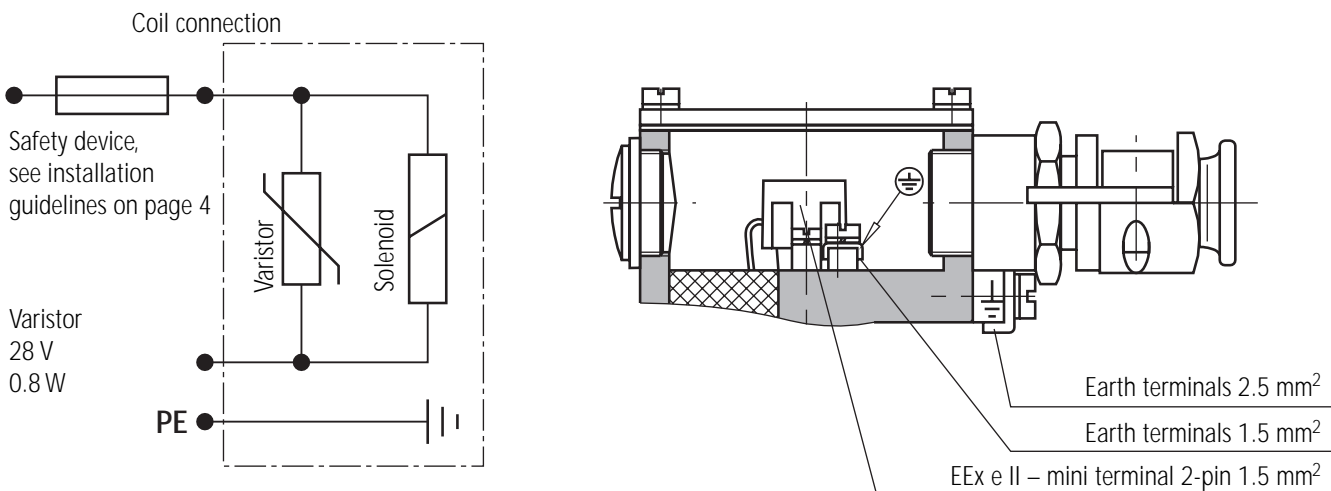
Installation guideline: The solenoids are to have the relevant safety devices fitted in the supply lines that corresponds to the nominal current. The switch-off characteristics of the safety devices must correspond with the possible short circuit current of the power supply!



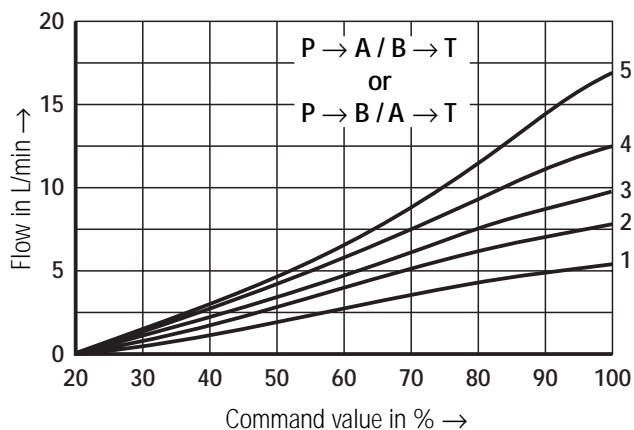
Technical data (for applications outside these parameters, please consult us!)

Control electronics (separate order) ¹⁾			
Amplifier in Eurocard format			VT-VSPA2-1-1X/.../T1-001 see RE 30 112
Power supply	Nominal voltage	VDC	24
Power consumption	I_{\max}	A	1.8

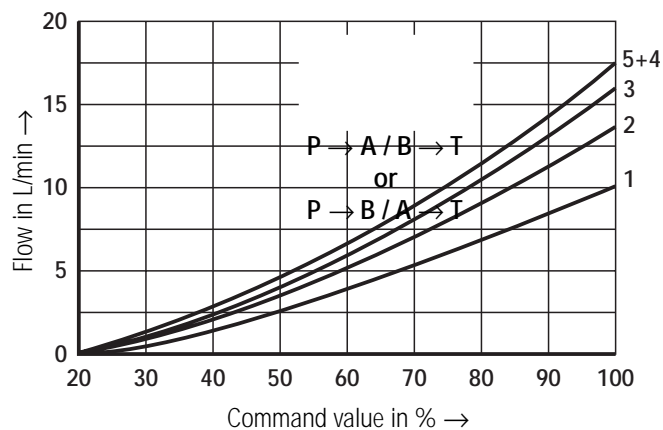
1)  **Attention!** The control electronics must be installed away from the explosion hazard area (please consult us).

Electrical connection**Characteristic curves** (measured at $v = 46 \text{ mm}^2/\text{s}$, $\vartheta = 40 \text{ }^\circ\text{C}$ and $I_{\max} = 1.03 \text{ A}$)**6 L/min nominal flow**

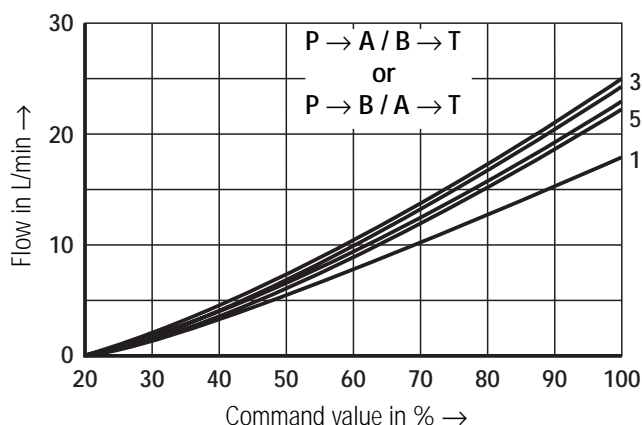
at a 10 bar valve pressure differential

**10 L/min nominal flow**

at a 10 bar valve pressure differential

**18 L/min nominal flow**

at a 10 bar valve pressure differential



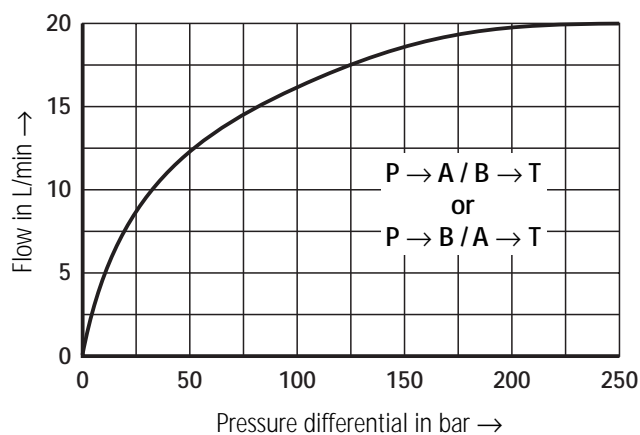
- 1 $\Delta p = 10 \text{ bar constant}$
- 2 $\Delta p = 20 \text{ bar constant}$
- 3 $\Delta p = 30 \text{ bar constant}$
- 4 $\Delta p = 50 \text{ bar constant}$
- 5 $\Delta p = 100 \text{ bar constant}$

$\Delta p =$ valve pressure differential to DIN 24 311 (inlet pressure minus the load and return pressures)

Characteristic curves (measured at $v = 46 \text{ mm}^2/\text{s}$, $\vartheta = 40 \text{ }^\circ\text{C}$ and $I_{\text{max}} = 1.03 \text{ A}$)

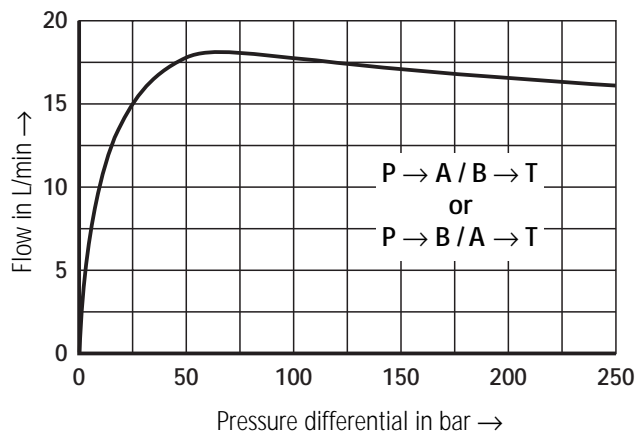
Performance limit

Nominal flow 6 L/min



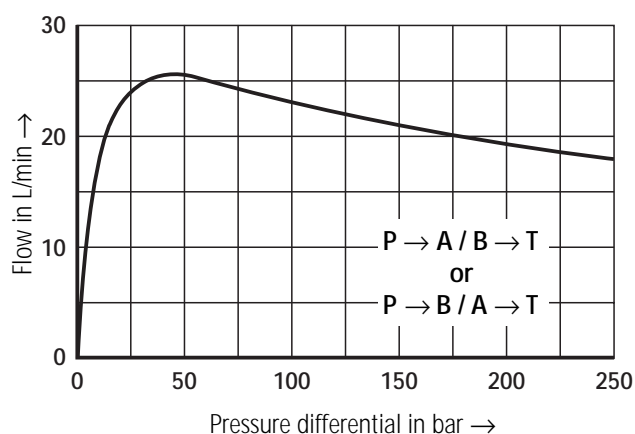
Performance limit

Nominal flow 10 L/min

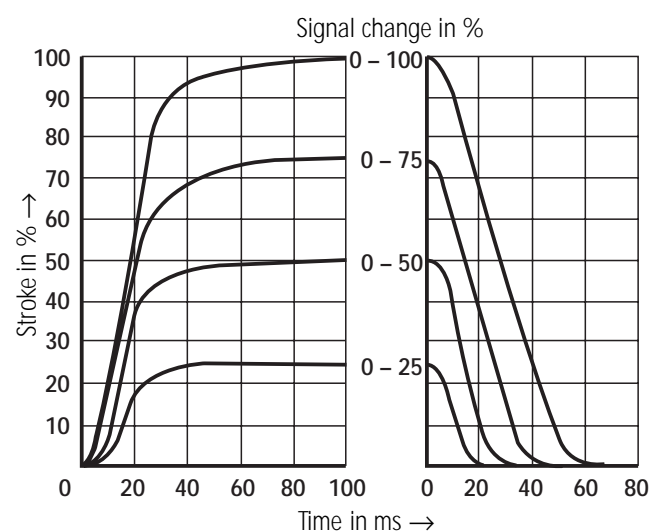


Performance limit

18 L/min nominal flow

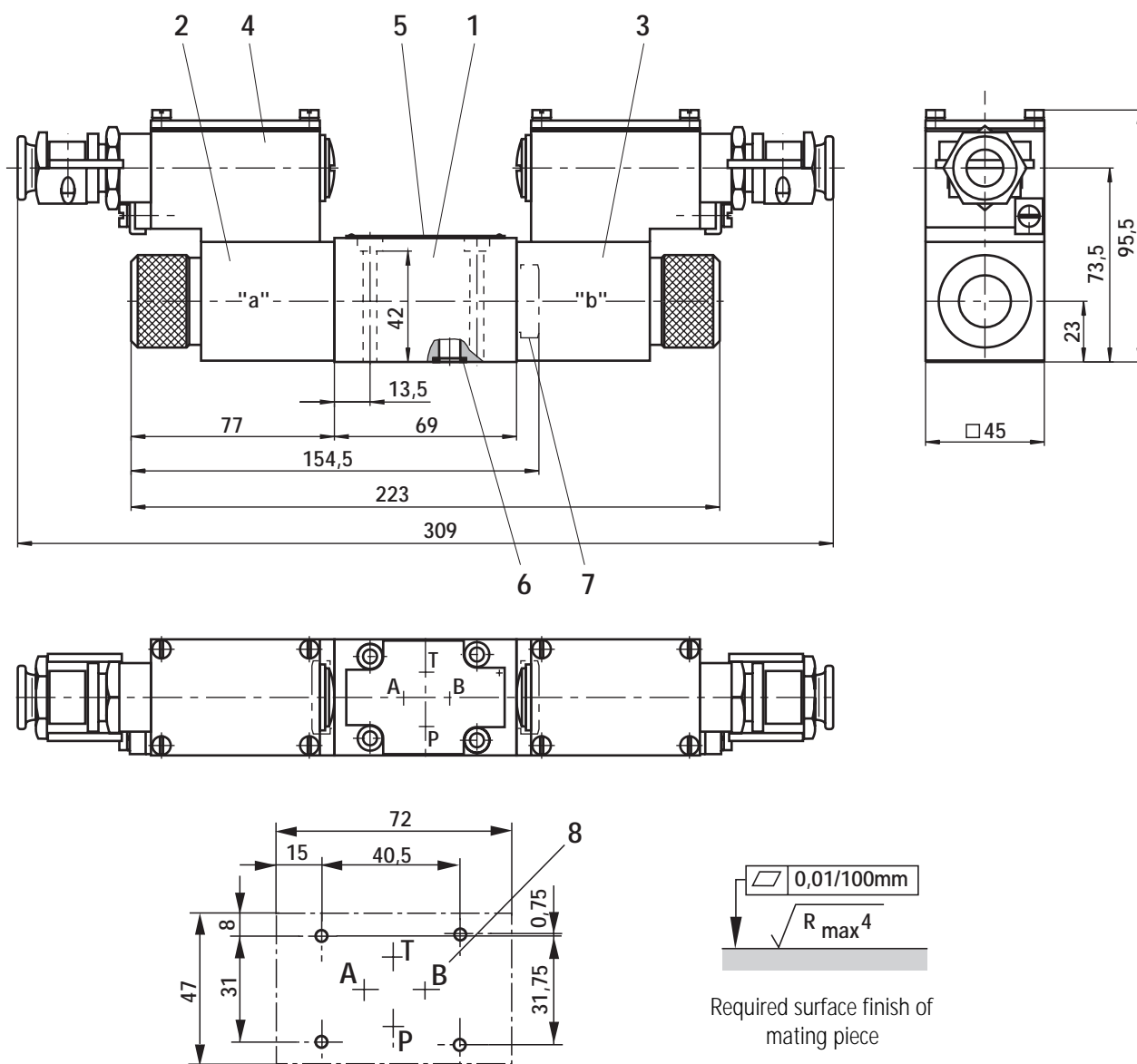


Transient functions with a step form of electrical input signal



Unit dimensions

(Dimensions in mm)



- 1 Valve housing
- 2 Proportional solenoid "a"
- 3 Proportional solenoid "b"
- 4 Terminal box
- 5 Name plate
- 6 R-ring 9.81 x 1.5 x 1.78 (ports A, B, P, T)
- 7 Plug for valve with one solenoid (2 switching positions, types **EA** or **WA**)
- 8 Machined valve mounting surface, location of ports to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H

Sub-plates to catalogue sheet RE 45 052 and valve fixing screws must be ordered separately.

Sub-plates: G341/01 (G1/4)
G342/01 (G3/8)
G502/01 (G1/2)

Valve fixing screws: 4 off M5 x 50 DIN 912-10.9; M_A
= 8.9 Nm

Notes

Mannesmann Rexroth AG
Rexroth Hydraulics

D-97813 Lohr am Main
Jahnstraße 3-5 • D-97816 Lohr am Main
Telefon 0 93 52 / 18-0
Telefax 0 93 52 / 18-23 58 • Telex 6 89 418-0

Mannesmann Rexroth Limited

Cromwell Road, St. Neots,
Huntingdon, Cambs. PE19 2ES
Tel: (01480) 476041
Fax: (01480) 219052

The specified data is for product description purposes only and may not be deemed to be guaranteed unless expressly confirmed in the contract.