

BCU01 Pneumatic Brake Actuator



This is a dual channel, fully redundant brake control unit designed for use on autonomous vehicles fitted with an air brake system. The BCU can be used in conjunction with the existing brake system or standalone.

Features

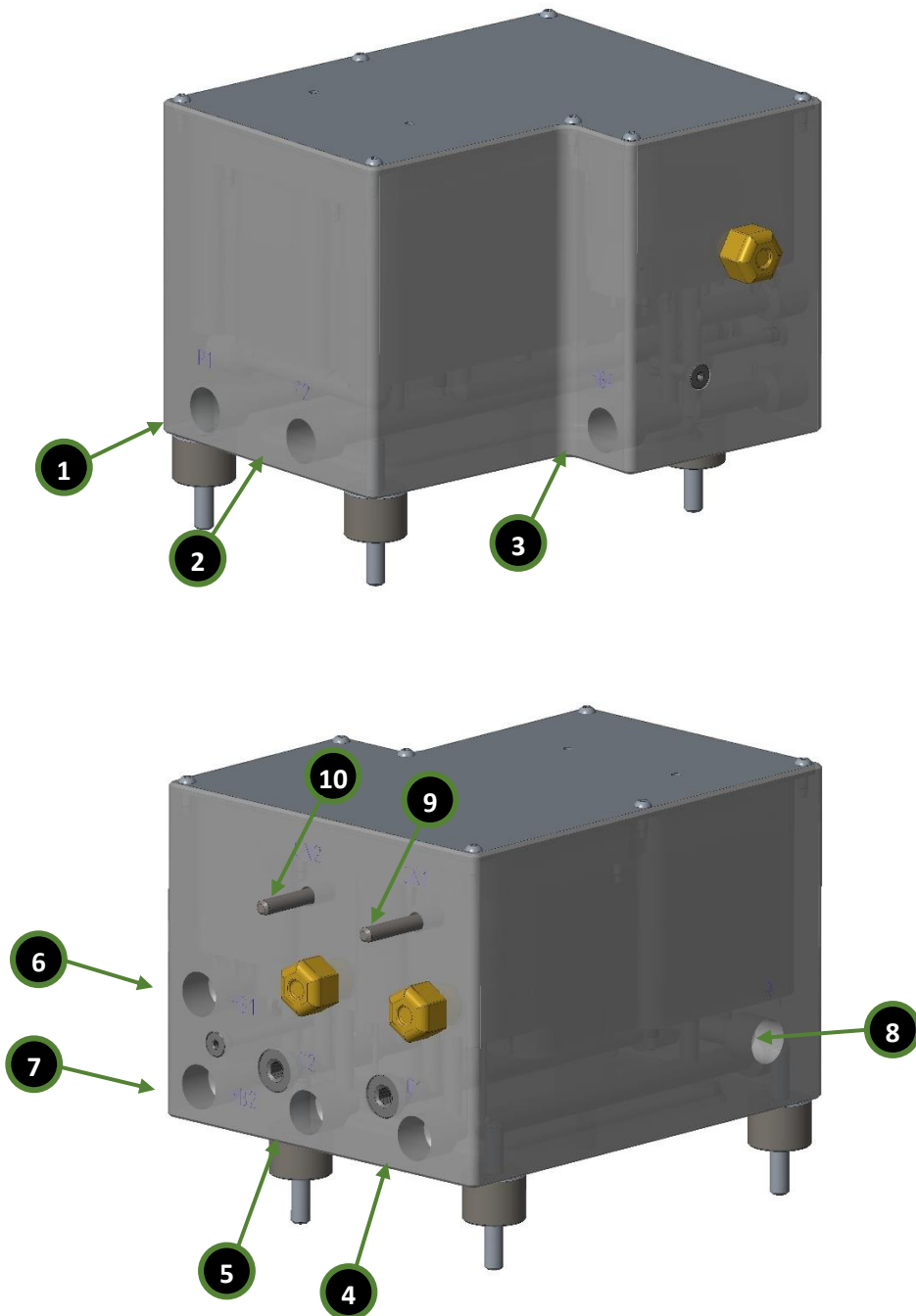
- 2 Independent proportional valves for brake actuation
- Each proportional valve has its own independent control ECU
- Shared “Handbrake” output valve (twin ports) with control from either ECU
- CAN operated (2 CANs on each port)
- Pressure & Temperature monitoring
- Integrated data-logging
- Designed for 24V operation (+12V upon request)
- Independent air supply input for each valve
- Independent power supply for each ECU

Technical Specification

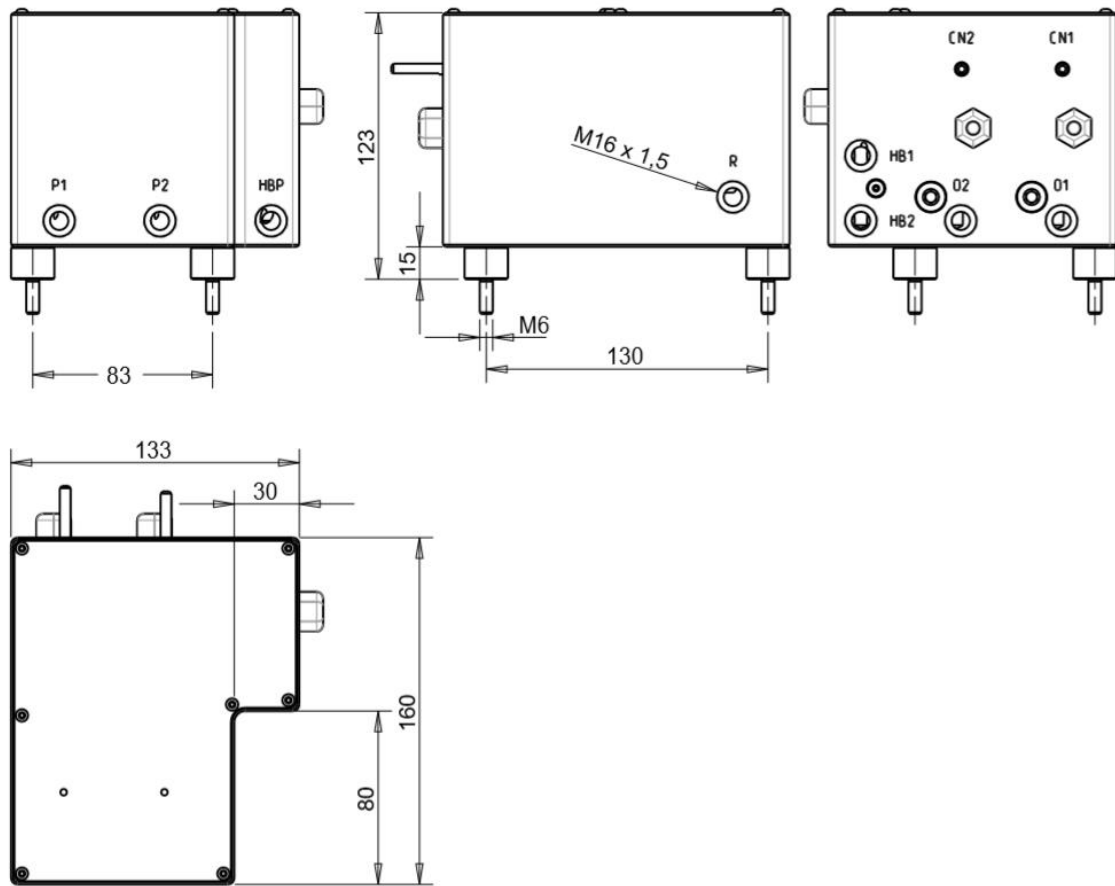
Dimensions L x W x H	160 x 133 x 123 mm
Weight	3.7 kg
Operating temperature	0 ... 90 °C (block temperature)
System Input pressure	5 ... 10 Bar
Output pressure (each port)	0 .. 10 Bar
Operating voltage	10V ... 30V

Connection Diagram

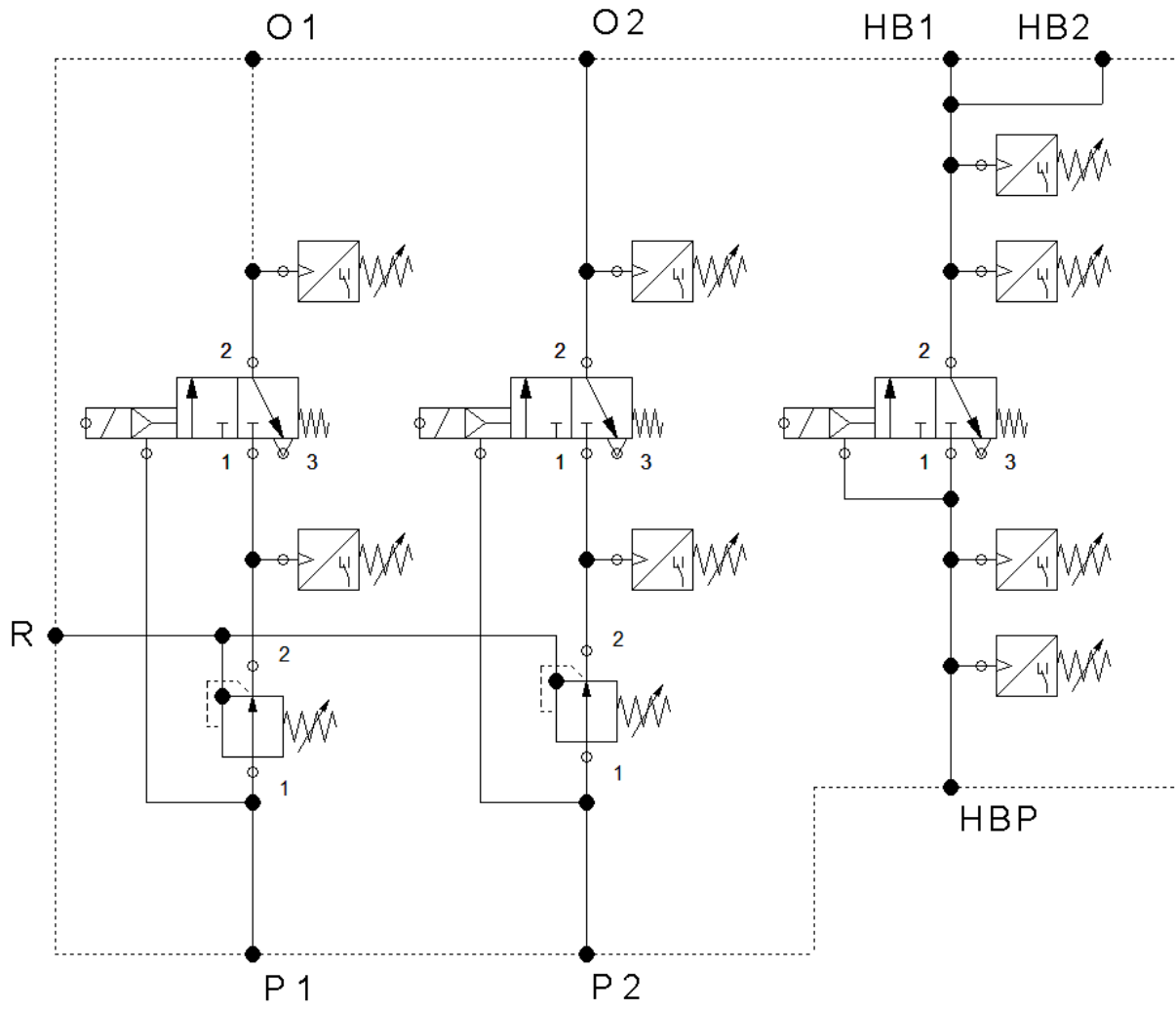
- ① Pressure supply port P1
- ② Pressure supply port P2
- ③ Hand brake pressure supply port HBP
- ④ Pressure output port O1
- ⑤ Pressure output port O2
- ⑥ Hand brake pressure output port HB1
- ⑦ Hand brake pressure output port HB2
- ⑧ Exhaust port R
- ⑨ Electrical cable CN1
- ⑩ Electrical cable CN2



Dimensional Drawing



Pneumatic Scheme



Wiring & Connecting

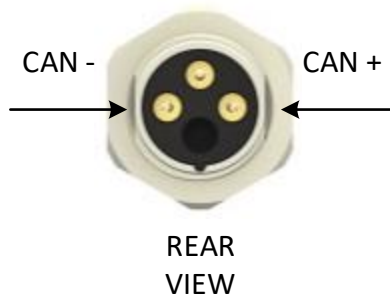
- Cable marked with CN1 represents output port 1 (O1)
- Cable marked with CN2 represents output port 2 (O2)

Wire Color	Function	DTM04-6P
Brown	Supply voltage	1
Blue	Ground	2
Yellow	CAN1+	3
Green	CAN1-	4
White	CAN2+	5
Grey	CAN2-	6
Red, Pink	N.C.	

Mating connector is Deutsch DTM06-6S

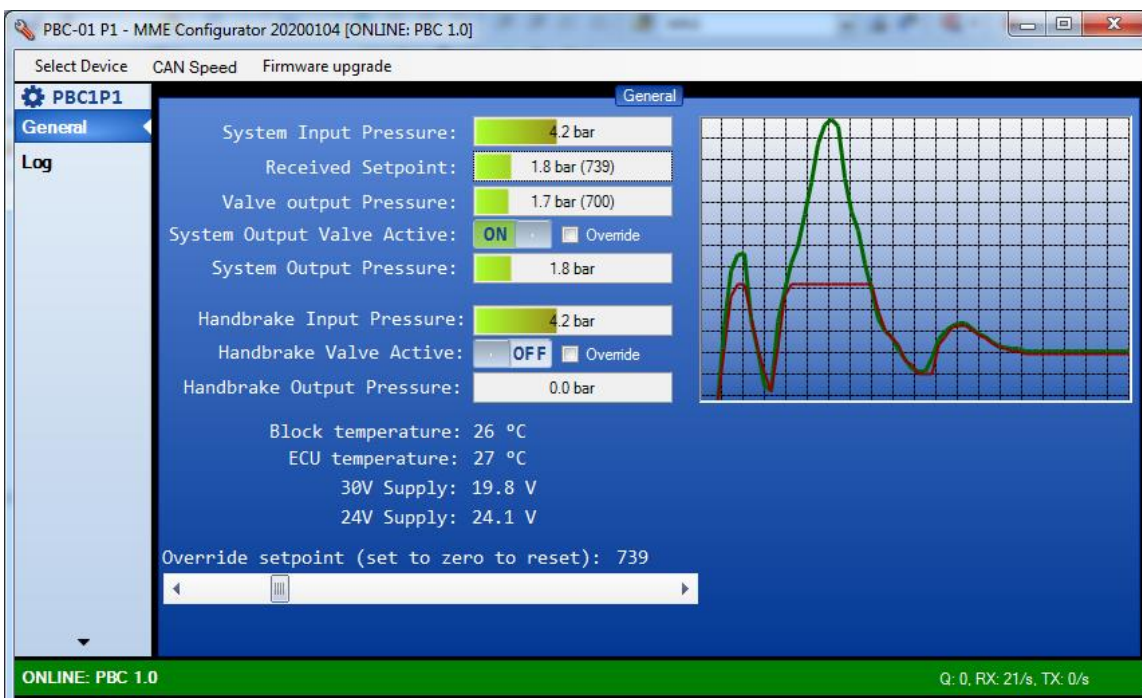
Connecting to the PC:

With each system we supply a small 3 pin connector to be connected into your vehicles CAN bus to allow communication with the BCU. It is wired as follows:



Contact us if you require the USB to CAN communication cable part number BCU01UTC.

Please download the latest MME Configurator from <http://www.mme-motorsport.com/en/download>



CAN BUS information

CAN speed = Auto Detect (250/500/1000)

P1 base = 0x500, P2 base = 0x510

CAN Broadcasting Data Set

ID	B0	B1	B2	B3	B4	B5	B6	B7
base	bits1	bits2	p.vlv.setpointH	p.vlv.setpointL	p.vlv.outH	p.vlv.outL	error	crc
base+0x1	supply24V	supply30V	p.supply	p.output	p.hb.input	p.hb.output	free	crc
base+0x2	t.block	t.cpu	free	free	free	free	free	crc

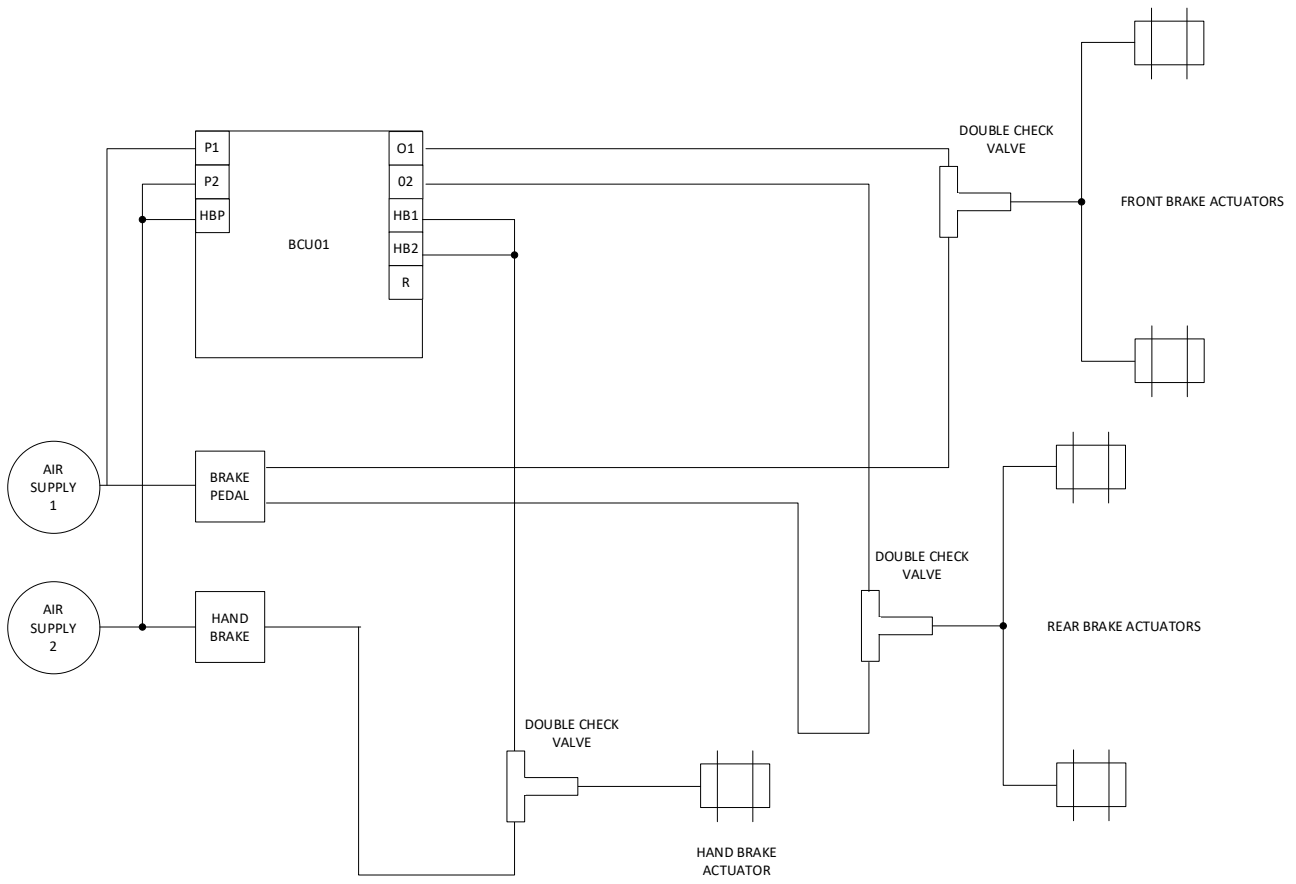
bits1	b0 - output valve active b1 – handbrake valve active b2-b7 – free
bits2	b0-b7 – free
p.vlv.setpointH+L	received setpoint (H*256 + L). 0 = 0 bar, 4095 = 10 bar
p.vlv.outH+L	output pressure directly at the proportional valve, before the output valve (H*256 + L). 0 = 0 bar, 4095 = 10 bar
error	error number (<i>not implemented yet</i>)
crc	crc checksum. Formula used: 1 + B0 + B1 + B2 + B3 + B4 + B5 + B6
supply24V	voltage supply at the output regulator. $V=(10+(X/255)*30)$
supply30V	input voltage supply. $V=(10+(X/255)*30)$
p.supply	Input pressure supply (P1 and P2). $P = X/10.0$
p.output	Output pressure (O1 and O2). $P = X/10.0$
p.hb.input	Input pressure on handbrake port (HBP). $P = X/10.0$
p.hb.output	Output pressure on the handbrake port (HB1+HB2). $P = X/10.0$
t.block	Temperature of the valve block. $T=-40+X$
t.cpu	CPU temperature. $T=-40+X$

CAN Commands

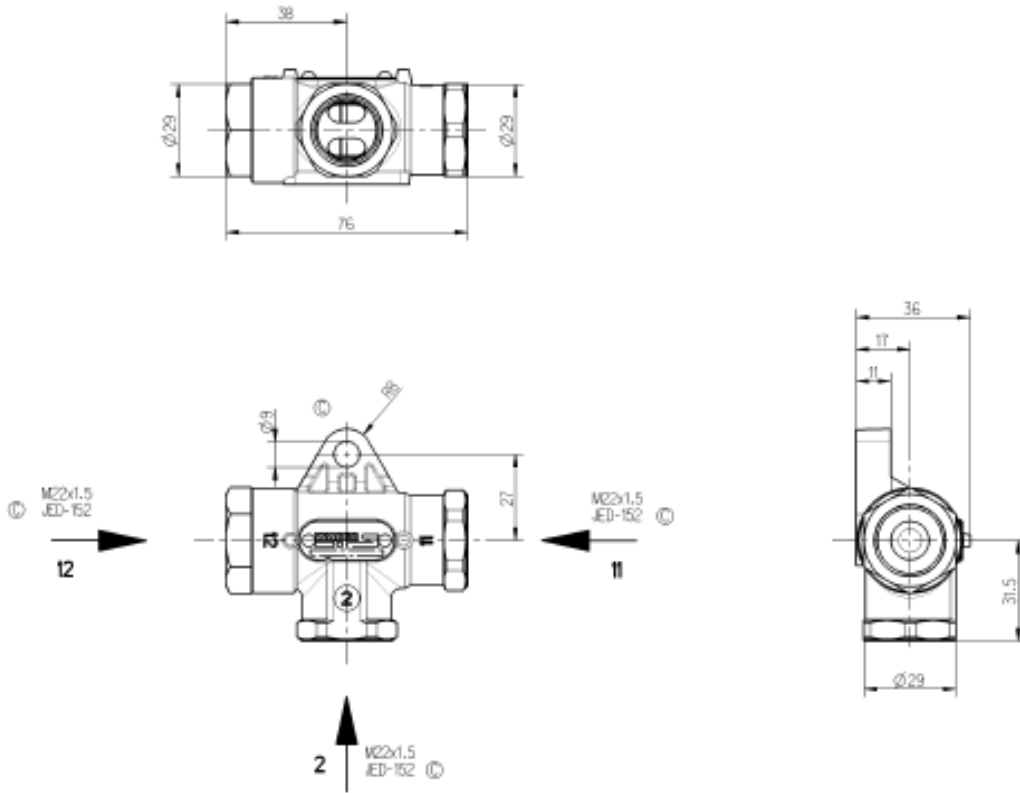
ID	B0	B1	B2	B3	B4	B5	B6	B7
base+0x100	p.setpointH	p.setpointL	hb	free	free	free	timestamp	crc

p.setpointH+L	set setpoint (MSB). 0=0 bar, 4095 = 10 bar																												
hb	set handbrake: 0 – no change 1 – handbrake on (HB1+HB2 pressurized) 2 – handbrake off (HB1+Hb2 released)																												
	<table border="1"> <thead> <tr> <th>P1 hb</th> <th>P2 hb</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>No change</td> </tr> <tr> <td>X</td> <td>1</td> <td>Handbrake on</td> </tr> <tr> <td>1</td> <td>X</td> <td>Handbrake on</td> </tr> <tr> <td>1</td> <td>2</td> <td>Handbrake on</td> </tr> <tr> <td>2</td> <td>1</td> <td>Handbrake on</td> </tr> <tr> <td>0</td> <td>2</td> <td>Handbrake off (if other hb is not active)</td> </tr> <tr> <td>2</td> <td>0</td> <td>Handbrake off (if other hb is not active)</td> </tr> <tr> <td>2</td> <td>2</td> <td>Handbrake off</td> </tr> </tbody> </table>		P1 hb	P2 hb	Result	0	0	No change	X	1	Handbrake on	1	X	Handbrake on	1	2	Handbrake on	2	1	Handbrake on	0	2	Handbrake off (if other hb is not active)	2	0	Handbrake off (if other hb is not active)	2	2	Handbrake off
P1 hb	P2 hb	Result																											
0	0	No change																											
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2	0	Handbrake off (if other hb is not active)																											
2	2	Handbrake off																											
timestamp	last sent timestamp+1. On power up, last timestamp=0.																												
crc	Formula: 1 + B0 + B1 + B2 + B3 + B4 + B5 + B6																												

Typical Pneumatic Installation



Example Check Valve



General Specification: 43-304-0		Copyright: WABCO®		WABCO	
Further Technical Data:		Date: 2008-01-08		Title: DOUBLE CHECK VALVE	
Des. Date:		Sheet: 1 of 1		ZWEIWEGE VENTIL	
General Tolerances: AS 201		2008-01-08		Arbeits: DOUBLE VALVE D'ARRET	
Range of Nominal Dimensions: ± 0.1 mm		2008-01-08		Satzzeichnungen: DOPPIA VALVOLA D'ARRESTO	
Class: 11		0.50		0.50	
Fine:		0.5		1.0	
Medium:		1.0		2.0	
Coarse:		2.0		3.5	
Tapped Holes: 0.1		3.0		4.0	
0.1 tolerance class Applied downstream		4.0		5.5	
A 2		510		0.75	
1:1		1:1		434 208 029 0	
A 2		510		005	
M		1/1		M	
1/1		1/1		1/1	



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www.dcemotorsport.com