Installation manual IM/ECACS Rev. C

EasyClean
Automatic Cleaning System

The Company

We are an established world force in the design and manufacture of measurement products for industrial process control, flow measurement, gas and liquid analysis and environmental applications.

As a part of ABB, a world leader in process automation technology, we offer customers application expertise, service and support worldwide.

We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance of the Company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

EN ISO 9001:2000

Cert. No. Q 05907

EN 29001 (ISO 9001)

Lenno, Italy – Cert. No. 9/90A

Stonehouse, U.K.

0255

Electrical Safety

This equipment complies with the requirements of CEI/IEC 61010-1:2001-2 'Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use'. If the equipment is used in a manner NOT specified by the Company, the protection provided by the equipment may be impaired.

Symbols

One or more of the following symbols may appear on the equipment labelling:

	**Warning** – Refer to the manual for instructions
	**Caution** – Risk of electric shock
	Protective earth (ground) terminal
	Earth (ground) terminal

	Direct current supply only
	Alternating current supply only
	Both direct and alternating current supply
	The equipment is protected through double insulation

Information in this manual is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of the Technical Publications Department.

Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.
2. Warning labels on containers and packages must be observed.
3. Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.
4. Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.
5. Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.
6. When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant hazard data sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

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Reference 04-0202

1. Introduction

The EasyClean Automatic Cleaning System uses the ‘zero gravity’ filter element to remove solid particles from liquids.

The filter element has raised bumps on the surface of each element which hold it apart from its neighbour. This gives the filter element its gap and, therefore, its micron rating.

What makes the filter unique is its ability to self-clean when backwashing. In filtering water passes from the outside of the filter to the inside, leaving particles larger than the gap behind. In backwashing the flow is rapidly reversed allowing the element to open slightly.

When opened the ‘zero gravity’ element opens evenly along its length, giving an even backwash. The dirt is released from the element and is washed away by the reversed flow.

In the EasyClean Automatic Cleaning System the backwash water is supplied from a tank of filtered water on the return side of the element. This tank (the expansion tank) contains a rubber diaphragm holding a volume of air. This air is pressurised and so the tank holds a volume of water at discharge pressure. During backwash this water is diverted by means of a valve to the inlet side of the filter element. This gives the filter its backwash.

The backwash on the EasyClean Automatic Cleaning System occurs when the three-way valve on the filter inlet rotates 90°. This closes the inlet to the system and opens the filter inlet to atmosphere. This gives the pressurised water a route out, backwashing the filter element.

The actuator on the backwash valve is a 12 V d.c. unit with a control board fitted.

The control board will backwash for one of two reasons: an external input (from a button, a pressure switch or other external signal); or from elapsed time.

This standard unit is configured to operate from the built-in timer. See ‘Control System’ for set up.

2. Safety

The recommended operating procedures have been designed with careful attention to safety. ABB has made formal safety reviews of the initial design and any subsequent changes. This procedure is followed for all new products and covers areas in addition to those included in applicable safety standards.

Observe the following safety precautions:

a. Observe all safety warnings marked on the equipment. These warnings identify areas of immediate hazard which could result in personal injury or loss of life.

b. Do not use this equipment for any purpose other than described in the manual.

c. Use the recommended connection procedures described in this manual.

d. This equipment should only be installed by suitably qualified personnel.

3. Technical Data / Specification

Quality Management System

The design and manufacturing processes of ABB are certified to the International Quality Standard ISO9001.

Compliance

The unit complies with all relevant directives of the European Union and is CE marked to indicate this.

Dimensions in mm (L x W x H) and Weight

630 x 240 x 770 (Note: A further 250 mm of clearance is required below the filter bowl).

Dry Weight:	5.7 kg
Maximum Wet Weight:	~15 kg

Operating Parameters

Power supply	100 to 240 V a.c.
Minimum working pressure	2 bar
Maximum working pressure	8 bar
Maximum operating temperature	50 °C
Maximum flow rate (no coil)	1.3 litres per second
Micron ratings	12, 25, 50, 75, 125, 200, 400

Materials Used

In contact with the liquid in the standard unit are the following:

Filter Coil	18/8 stainless steel 304 to aircraft quality DID 734
Filter Cage	Glass filled polypropylene - AP30G WRC approved blend
	Stainless steel internal spring
	Stainless steel internal lock
	Stainless steel internal fixings
Filter Housing	Clear SAN (Styrol-Acryl-Nitril)
Adaptor	Virgin polypropylene
O-Ring	Nitrile rubber (approved for food use)
Housing Top	Blue polypropylene with relief valve
Pipework	PVC
Expansion tank	8 Litre - butyl liner in coated steel
Valve	¾ in. BSP three way ball valve
Actuator	Valpes Nylon and coloured ABS
Controller	Cavvon EasyClean/1 9721
Bracket	Stainless Steel

Parts not in contact with the liquid are as follows:

Actuator body	Glass-filled nylon
Actuator cover	Coloured ABS

4. Operation

Power Supply

A pre-wired switched-mode power supply is provided. This is suitable for 100 to 240 V a.c. input.

Filter Element

The filter element is normally supplied fitted to the filter housing and usually comes with a small amount of protective material around the coil. This material must be totally removed prior to operation. When it is required to clean or replace the coil it should be done with some care as follows:

1. Ensure the filter is isolated
2. Remove pressure from housing
3. Remove filter bowl (unscrew large blue collar)
4. Gently grasp TOP of element and rotate slightly with a pulling action to remove. DO NOT pull element from bottom as this will damage it. If necessary, lever the top of the element gently with a large screwdriver.

Pipe Connections

There are three ports for connection: the inlet; the return; and the backwash ports. The inlet (normally open) is a ¾ in. BSP female connection on the three way ball valve. The return is from the 6 mm compression fitting on the valve. The backwash port is the other (normally closed) ¾ in. BSP female connection on the three way ball valve.

The backwash port must run in a minimum size of 22 mm / ¾ in. to a suitable drain or receptacle. Be aware that water rushes from the line very quickly and so the backwash may cause splashing. Any flexible tube used must be secured to prevent it from coming loose during backwash.

Filter Support and Location

The unit is fitted to a backboard ready for wall mounting. To reduce the chance of organic build-up the EasyClean should not be located in areas of bright light.

Pressure and Flow Settings

The flow and pressures should be no higher than those set out in the specifications for this product.

Standard maximum pressure for the unit is 8 bar. Maximum flow should be no more than 1.3 l/s for single filters with a micron rating of 50 or higher. Higher flows can be accommodated but the velocity through the unit's waterways will be higher than recommended.

The air pressure in the expansion tank should be set at 1 to 2 bar.

The minimum pressure at which the unit will work efficiently is 2.5 bar. Below this pressure, the unit may not backwash efficiently.

Pump (if fitted)

If a pump is used to create the flow and/or pressure, ensure that it is capable of pumping against a closed head. During backwash, the diverting valve closes the inlet and opens the backwash port. On certain types of pump this can cause damage.

Regulating Valve

On all filters a regulating device must be fitted to the discharge side of the filter to ensure that there is sufficient pressure for backwash. In some systems this may be in the form of a restriction pipe run, or a simple non return valve. The standard single unit comes complete with a ½ in. ball valve for this purpose. This valve must be set so that the pressure on the discharge side of the filter is no lower than stated above.

Isolating Valves

Isolating valves should be fitted on the inlet and return of the filter so that it can be isolated from the system during routine maintenance. If the unit is fitted to a system which must not lose flow then a bypass valve should be fitted around the filter.

Control System

The backwash valve on the EasyClean Automatic Cleaning System is turned by a 12 V actuator. This actuator is controlled by a purpose-built control board which operates the 12 V d.c. motor, turning the output shaft clockwise and counter clockwise.

Within the actuator a set of cams operate limit switches to switch the motor off. One switch gives the filtering position of the valve and one gives the backwash position. The other two switches can be used for signalling externally or for other indication.

In standard form, the cams need not be adjusted for the life of the filter. If adjustment is needed, a small flat-headed screwdriver is used to adjust the cam around the drive shaft.

There are two adjustments available on the control board. These are for backwash duration and for backwash interval:

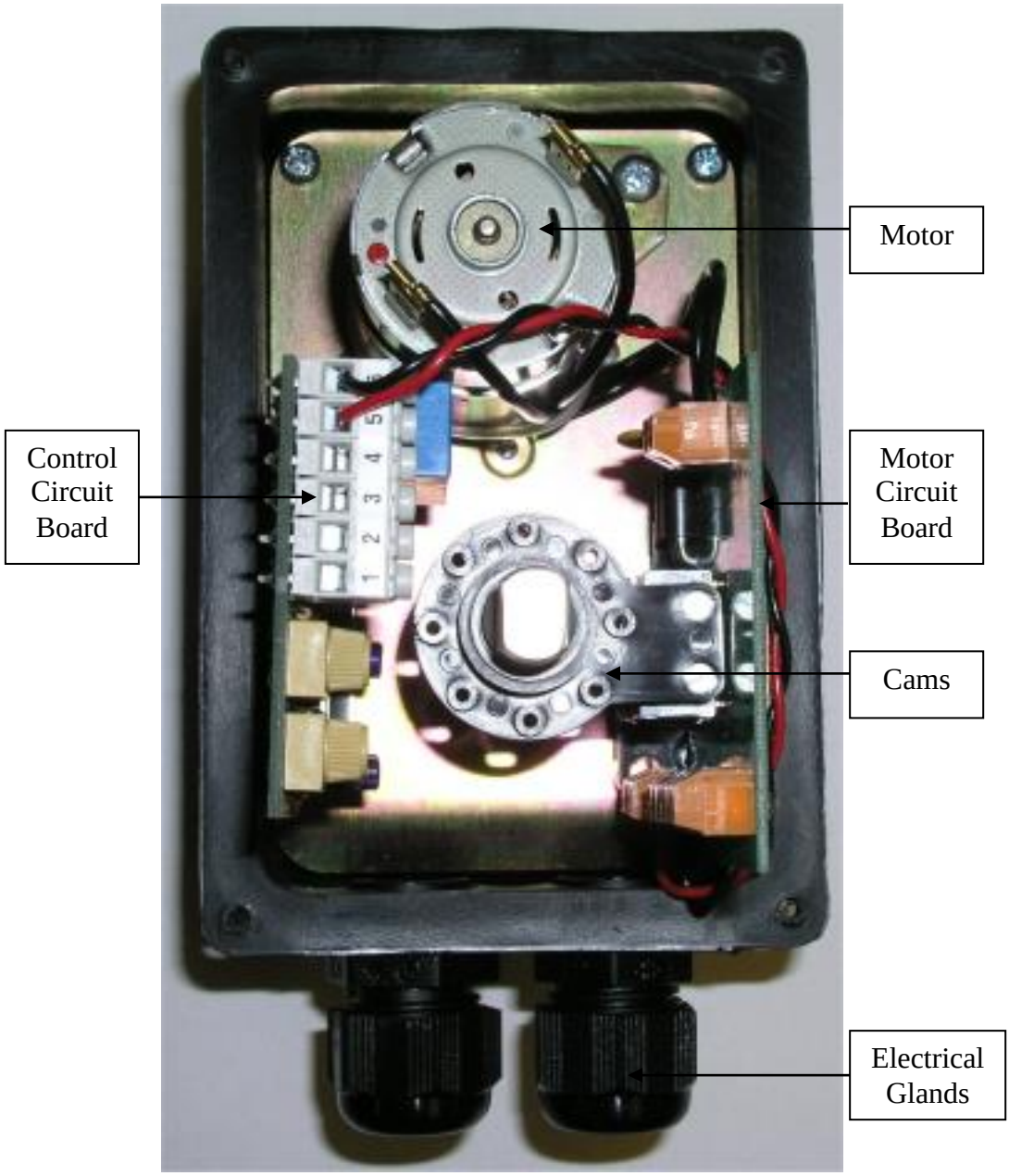
The backwash duration is the length of time the filter backwashes. It generally is set between 1 and 4 seconds although it can be set between 1 and 10 seconds. Any longer than 4 seconds will usually empty the expansion tank and any shorter will not give a sufficiently good backwash. The adjustment is made with the light brown potentiometer nearest the terminal strip. To increase time, turn clockwise.

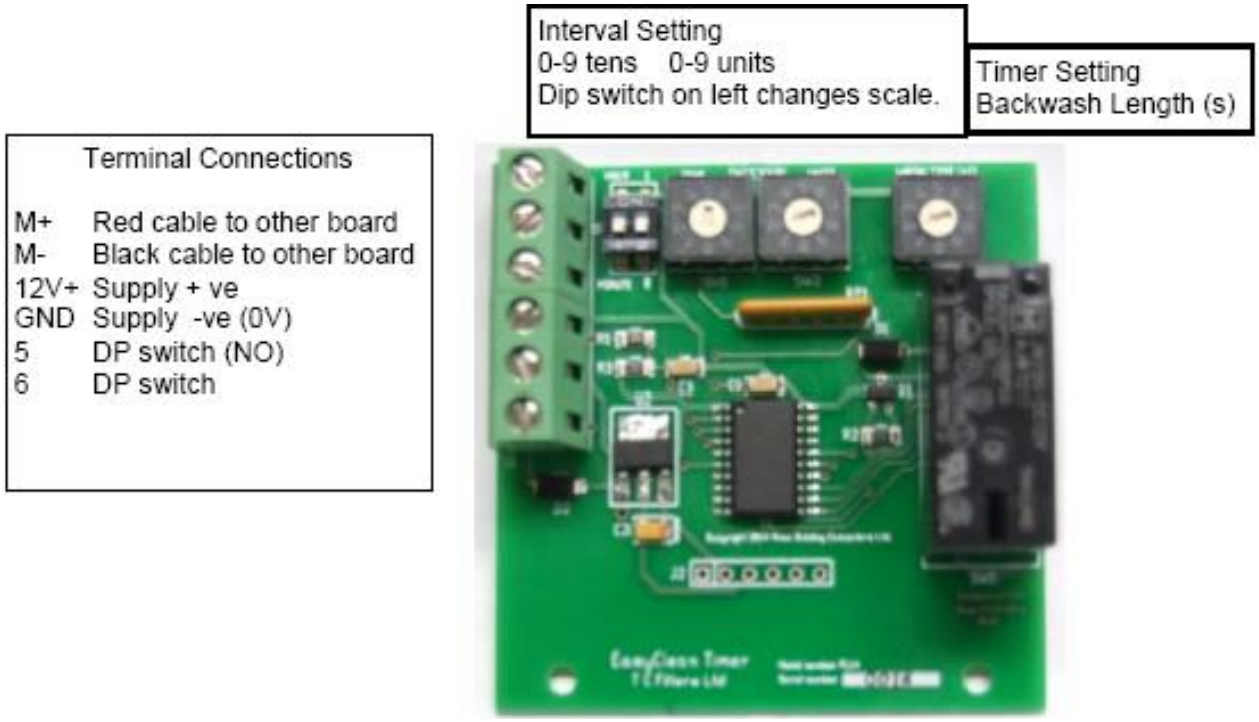
The backwash interval is the default time between backwashes. This means that if the filter is not backwashed from an external signal for a specific period of time it will do a default backwash. This default interval can be set between 2 minutes and seven days. There are two controls for setting the interval timer, a potentiometer and a jumper.

The jumper has two positions. There are three pins, marked A, B and C. Putting the jumper across A and B gives a range of up to 2 hours approximately. Putting the jumper across B and C gives the range from 2 hours to 7 days. The time is set using the potentiometer furthest from the terminal strip, with a clockwise movement to increase the time.

The default timer is automatically reset every time a backwash is initiated from an external signal, so, for example, if the optional differential pressure switch makes the timer will reset to zero.

Automatic Actuator with Cover Removed





WARNING

Do not put any object into the ball valve itself. The actuated ball can be cut and will be damaged if jammed. Keep clear of the valve once the power has been applied. Remove all power before working on the valve.

Electrical Connections

All connections into the actuator controls should be as above. Cable glands are provided for a pair of incoming cables and these should be used in order to ensure a watertight seal. If not used, the cable gland should be sealed.

Important Notes:

Backwash Start Delay

The standard unit has a five second On timer which requires the contact across terminals 1 and 2 to be made for five seconds before the backwash starts.

The five second On timer is inserted to allow the expansion tank some time to fill up after a backwash. In trials with finer micron filters, which have much smaller flow rates, the additional flow across the coil to fill the tank can create a temporary differential pressure which can cause the differential pressure switch to make.

In effect, if a switch is used to operate the backwash on the standard unit this must be held for five seconds before a backwash starts.

Backwash Signal Hold

If the signal to backwash is still present at the end of the backwash, then the unit will not backwash. This means that if any switch used to start the backwash is not reset, then the unit will fail to backwash. Ensure that any backwash switching used is automatically reset during the backwash.

Recommended Maintenance

The frequency of any maintenance for the EasyClean Automatic Cleaning System depends entirely on the quality of the water being filtered.

Most filters will need only an annual inspection. In this case, the coil should be removed and inspected. Any build up of particles or deposits from hard water should be removed. If any chemical cleaners are used, care should be taken to ensure that they are compatible with the materials of construction. The filter housing bowl should be cleaned out at the same time.

In areas of high dirt loading the filter may become blocked over time and so will need periodic cleaning. This is especially true of water with a high organic content, such as river water. In this case the filter element will need to be removed and cleaned more frequently. The bowl should be cleaned out and the filter element cleaned.

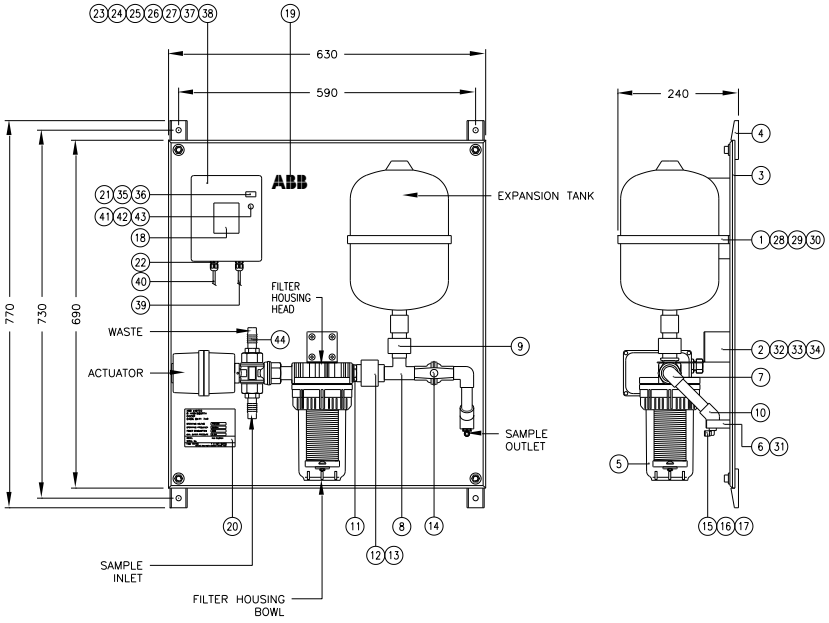
Trouble Shooting

If the backwash line starts to leak during filtration then the entire valve should be replaced.

Should there be no flow during backwash it is possible that the expansion tank membrane has perforated. The membrane can sometimes be checked and replaced, but it is usually less expensive to replace the entire tank unit.

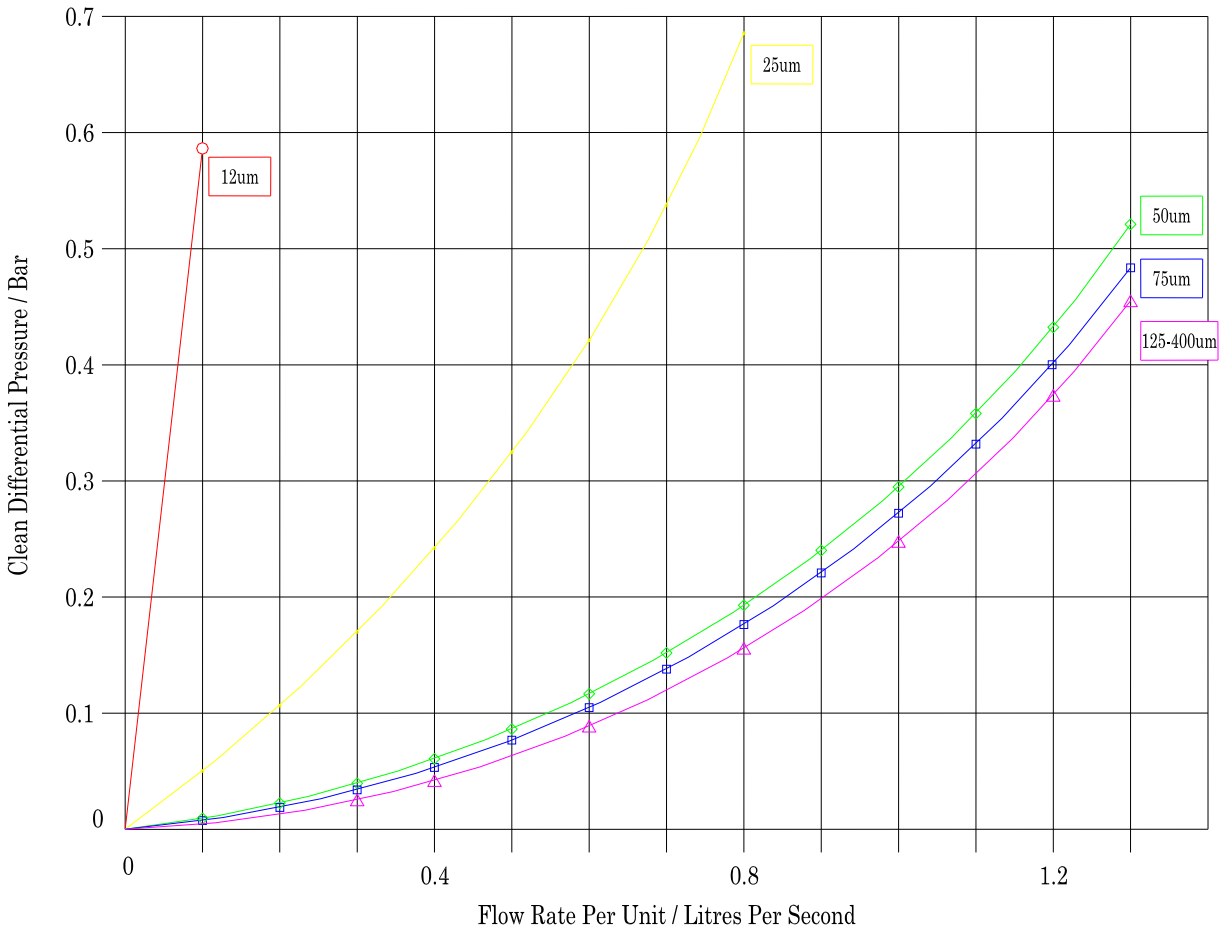
In case of the unit not backwashing from a signal, check the fuse within the actuator casing.

EasyClean Automatic Cleaning System Drawing



ITEM No.	DRG. CODE No.	DESCRIPTION	No. OFF ASSY a	b	c
1	03-0292	TANK BRACKET	1		
2	07-0254	MOUNTING BLOCK	1		
3	07-0255	BACK BOARD	1		
4	19-0001	WALL MOUNTING BRACKET	4		
5	23-0021	AUTO 25uM FILTER	1		
6	24-0033	3/4" MACLOW CLIP	1		
7	24-0039	1/2" 90° ELBOW	1		
8	24-0042	1/2" TEE PIECE	1		
9	24-0044	1/2" SOCKET UNION	1		
10	24-0045	1/2" 45° ELBOW	1		
11	24-0052	3/4" HEXAGON NIPPLE	1		
12	24-0053	3/4" SOCKET UNION	1		
13	24-0059	3/4" x 1/2" REDUCER	1		
14	24-0078	1/2" COMPACT BALL VALVE	1		
15	24-0093	1/2" x 3/8" REDUCER	1		
16	24-0094	3/8" x 1/4" REDUCER	1		
17	25-5017	1/4" BSP x 6mm ELBOW	1		
18	31-0119	MAINS VOLTAGE LABEL	1		
19	31-0291	ABB LOGO	1		
20	31-0267	SERIAL No. LABEL	1		
21	51-0015	LATCH SWITCH	1		
22	58-0036	PG11 CABLE GLAND	2		
23	63-0021	METAL SPACER	4		
24	63-0204	ELECTRICAL BOX	1		
25	37-0024	M4 PLAIN WASHER	4		
26	37-0026	M4 SHAKEPROOF WASHER	4		
27	37-0035	M4 x 12 PAN HD. POZI	4		
28	37-0054	M5 PLAIN WASHER	2		
29	37-0056	M5 SHAKEPROOF WASHER	2		
30	37-0065	M5 x 16 HEX HD.	2		
31	37-0075	M5 x 35 CSK POZI	1		
32	37-0084	M6 NYLOC NUT	4		
33	37-0085	M6 PLAIN WASHER	4		
34	37-0101	M6 x 75 PAN HD. POZI	4		
35	51-0019	GREEN LENS	1		
36	52-0008	WEDGE BULB 12v	1		
37	58-0061	P-CLIP SIZE 1	1		
38	63-0278	POWER SUPPLY	1		
39	58-0126	0.5mm CABLE 2 CORE	A/R		
40	58-0113	1.0mm CABLE 3 CORE	A/R		
41	60-1000	FUSE HOLDER	1		
42	60-1001	FUSE HOLDER BOOT	1		
43	60-0036	1A ANTI SURGE FUSE	1		
44	24-0055	3/4" HOSETAIL	2		

Flow Chart



Notes

Products and customer support

Automation Systems
For the following industries:
- Chemical & Pharmaceutical
- Food & Beverage
- Manufacturing
- Metals and Minerals
- Oil, Gas & Petrochemical
- Pulp and Paper

Drives and Motors
- AC and DC Drives, AC and DC Machines, AC Motors to 1kV
- Drive Systems
- Force Measurement
- Servo Drives

Controllers & Recorders
- Single and Multi-loop Controllers
- Circular Chart and Strip Chart Recorders
- Paperless Recorders
- Process Indicators

Flexible Automation
- Industrial Robots and Robot Systems

Flow Measurement
- Electromagnetic Flowmeters
- Mass Flowmeters
- Turbine Flowmeters
- Wedge Flow Elements

Marine Systems & Turbochargers
- Electrical Systems
- Marine Equipment
- Offshore Retrofit and Refurbishment

Process Analytics
- Process Gas Analysis
- Systems Integration

Transmitters
- Pressure
- Temperature
- Level
- Interface Modules

Valves, Actuators and Positioners
- Control Valves
- Actuators
- Positioners

Water, Gas & Industrial Analytics Instrumentation
- pH, Conductivity and Dissolved Oxygen Transmitters and Sensors
- Ammonia, Nitrate, Phosphate, Silica, Sodium, Chloride, Fluoride, Dissolved Oxygen and Hydrazine Analyzers
- Zirconia Oxygen Analyzers, Katharometers, Hydrogen Purity and Purge-gas Monitors, Thermal Conductivity

Customer support
We provide a comprehensive after sales service via a Worldwide Service Organization. Contact one of the following offices for details on your nearest Service and Repair Centre.

UK
ABB Limited
Tel: +44 (0)1453 826661
Fax: +44 (0)1453 829671

USA
ABB Inc.
Tel: +1 215 674 6000
Fax: +1 215 674 7183

Client Warranty
Prior to installation, the equipment referred to in this manual must be stored in a clean, dry environment, in accordance with the Company's published specification. Periodic checks must be made on the equipment's condition. In the event of a failure under warranty, the following documentation must be provided as substantiation:
- A listing evidencing process operation and alarm logs at time of failure.
- Copies of all storage, installation, operating and maintenance records relating to the alleged faulty unit.

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