

ATEX/IECEX Coil Manual

Type 200 and 300 Series Coils

for EH70 Series Solenoid Valves

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The Clark Cooper Division of Magnatrol Valve Corporation offers ATEX coils of various voltages for explosive atmospheres in compliance with European directive 2014/34/EU, Annex III and the IECEx Scheme, and standards EN 60079-0:2012+A11:2013, EN 60079-1:2014, IEC 60079-0, 6th Edition, and IEC 60079-1, 7th Edition.


Intended Use

The 200 and 300 Series coils are utilized on the Clark Cooper EH70 solenoid valve product line. All ATEX related approvals were conducted on EH70 valve components. EH70 valves are used for a wide spectrum of fluids and gases compatible with the construction materials. The coils are rigidly mounted around the valve bonnets.

ATEX coils are suitable for use in equipment group II, equipment category 2G (gas, vapors, mist), atmosphere group IIC (includes hydrogen, acetylene), and utilize protection type “db” (flameproof Zone 1 Equipment Protection Level Gb) for temperature class T3. The product is not certified for explosion proof protection in dusty areas. See other sections for surrounding air and fluid temperature ranges.

Marking

The following marking applies to all 200 and 300 Series coils in all voltages and lead lengths offered, per EC-Type examination certificate number IBExU15ATEX1178 X and IECEx IBE 17.0036 Certificate of Conformance:

 **II 2G Ex db IIC T3 Gb**
-20°C ≤ T_a ≤ max. +60°C

Per IBExU Institut für Sicherheitstechnik GmbH test report IB-14-3-080.

Technical Specifications of ATEX Explosion Proof Rated Coils

Coil Part Number	Series Model	Voltage	Watts	Current (amps)	For use on sizes of EH70
707735-01	200	24V AC/DC	80	3.29	EH70-08 (½"), EH70-12 (¾"), EH70-16 (1")
707735-02	200	120V AC/DC	80	0.74	
707735-03	200	220V AC/DC	80	0.44	
707736-01	300	24V AC/DC	116	4.80	EH70-24 (1 1/2"), EH70-32 (2")
707736-02	300	120V AC/DC	107	1.00	
707736-03	300	220V AC/DC	97	0.44	

Table 1 – Coil Assembly Part Numbers

Usage:

The nominal voltage should be applied to coils, however, a variation of ±10% is typically allowed. Maximum surface temperatures were determined per BS EN 60079-0:2012+A11:2013, section 26.5.1.3, which allows this range.

Coils may be cycled on and off at any frequency. The valve operational frequency limitation is dependent upon how long it takes the valve to open and close for a given fluid and flow rate. There is no inrush current associated with these coil designs. A four-diode bridge circuit rectifies the power when AC voltage is applied. In all cases, the copper coil is only exposed to DC current. Peak coil temperatures are reached via long energize periods on the order of 3 or 4 hours.

Surrounding Air and Fluid Temperatures:

The applicable temperature ranges approved for ATEX certified coils is as follows:

Surrounding air: -20°C to +60°C

Fluid: cryogenic to 150°C maximum

Temperature Classification: T3

Lead Cables:

Both 200 and 300 Series coils are non-polar. Either lead wire may be line voltage. The standard cable length on the coils is 3000mm [9.8 ft]. Customized lengths are available. The cable has two 1.0 sq mm cores with silicone insulation rated for -60°C to 180°C.

The IECEx/ATEX Ex d gland with a ½" NPT male end is threaded into the coil enclosure and seals around the silicone jacketed cable.

A 192°C thermal cutoff fuse is built into the coil as a measure of protection.

Construction:

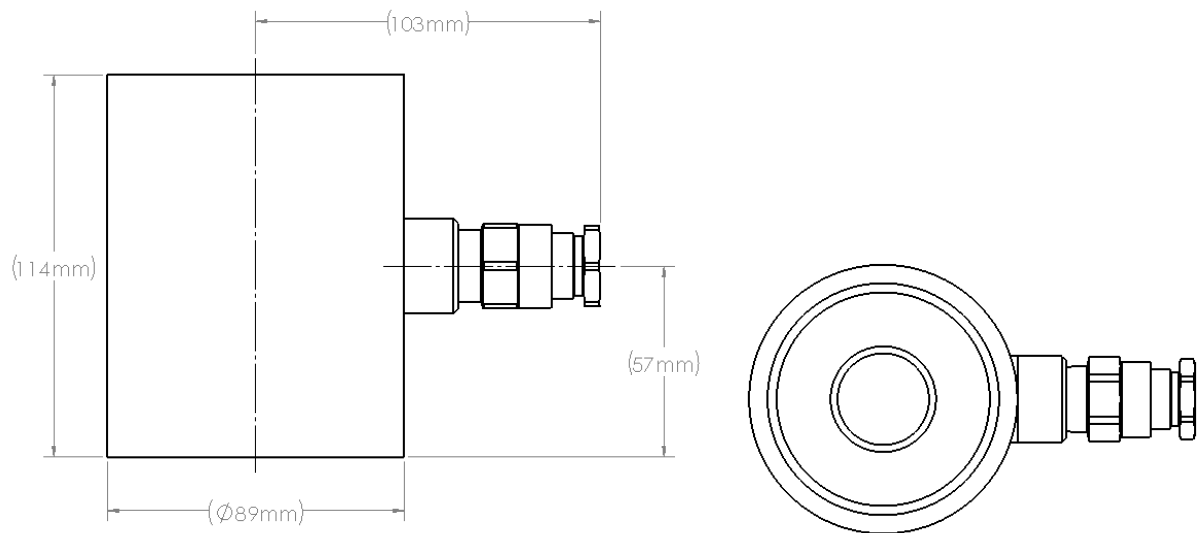


Figure 1 – Front and Top View, 200 Series Coil, 707735

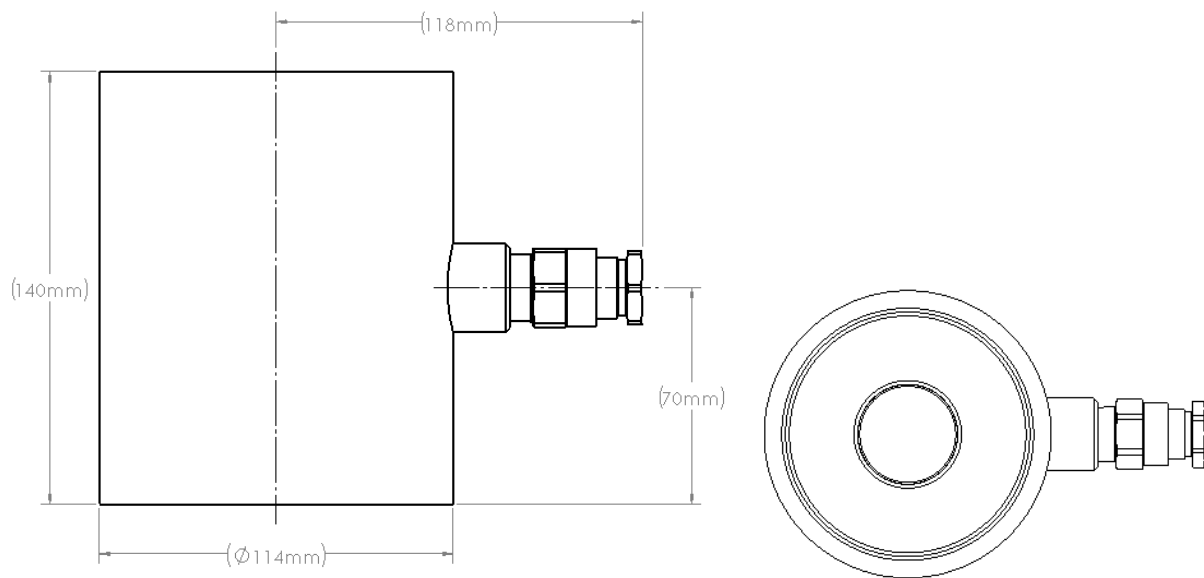


Figure 2 – Front and Top View, 300 Series Coil

The coil enclosures are seal-welded carbon steel canisters. The center column that fits around the valve bonnet tube is austenitic stainless steel. A flame retardant silicone potting compound with high thermal conductivity surrounds the copper coil inside and conducts heat to the surface. The surface is painted with high temperature black paint, for which a high emissivity coefficient reduces core temperature.

Salable Parts List:

200 Series Coil complete assembly part number: 707735

300 Series Coil complete assembly part number: 707736

Suffix numbers 01, 02, and 03 are for various voltages per Table 1.

Cable gland: 70773400000

Solenoid Valves:

The ATEX 200 and 300 Series coils are approved for and utilized on the Clark Cooper EH70 product line. The coil, in conjunction with components inside the valves, forms a solenoid and acts to open and close the valve upon energizing.

The ATEX certification applies to all configurations of EH70's, provided that the configuration does not affect the performance or resulting maximum surface temperature of the coils, so as to not exceed the T3 rating for the allowable ambient and fluid temperature range.

Product & Orifice Code	Orifice (mm)	Maximum Inlet Pressure (kPa)	C _v	Coil Type Used
EH70-08	12.7	10342	3.5	200 Series
EH70-12	19.1	8274	7.5	200 Series
EH70-16	25.4	8274	13	200 Series
EH70-24	38.1	8274	25	300 Series
EH70-32	50.8	8274	48	300 Series

Table 2 – EH70 Maximum Inlet Pressures

Part number breakdown: EH70-XXX-XXXX-X-XX

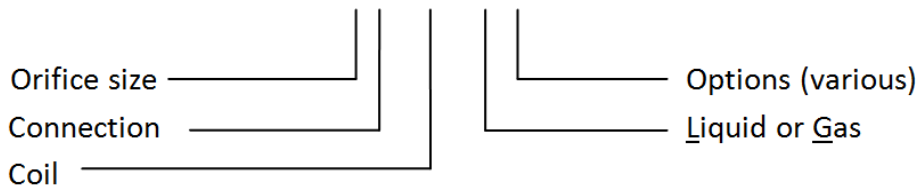


Figure 3 – EH70 Part Number Breakdown

Use Tables 2 through 6 to build a part number per Figure 3.

Connection Code	Connection Description
A	NPT per ANSI/ASME B1.20.1
B	Socket
G	ANSI B16.5 Class 150 raised face flange
H	ANSI B16.5 Class 300 raised face flange
J	ANSI B16.5 Class 600 raised face flange

Table 3 – Connection Types

Coil Code	Voltage
A024 or D024	24V AC or DC applied
A120 or D120	120V AC or DC applied
A240 or D240	240V AC or DC applied

Table 4 – Coil Voltages

Media Code	Media Description
L	Liquids
G	Gases

Table 5 – Liquid or Gas configuration

Option Code	Option Description
CY	Cryogenic configuration.
HY	Class 5 sealing per FCI 91-2-2004 with helium.
NO	Normally open configuration.
OX	Cleaned for oxygen service.
S1	Single switch to indicate piston position.
SS	Stainless steel tag.
X1	Single explosion proof switch.
T5	Class 5 sealing per FCI 91-2-2004.
1A	ATEX certified coil: Ex II 2G Ex db IIC T3 Gb, $-20^{\circ}\text{C} \leq \text{Ta} \leq \text{max. } +60^{\circ}\text{C}$

Table 6 – Option Codes

Safety:

- Depressurize a system before trying to remove or partially disassemble the valve.
- Do not pressurize the valve without the coil installed. While the valve is designed to not burst at pressures approaching four times the rated maximum inlet pressure, in some cases the coil may provide a portion of that inherent strength.

- If the cable from the coil needs to be directed a certain way, loosen the nut on top of the coil before trying to position. Do not grab any portion of the bonnet tube with a wrench or pliers.
- When used under the acceptable conditions outlined in this manual, the surface temperature of the coils will approach 195°C if held energized for long periods of time with the maximum allowable fluid and surrounding air temperatures.
- Check the connections and the gasketed bonnet joint using a soapy water solution to indicate small gas leaks.
- Institute lock out tag out on the coil during maintenance.

Troubleshooting:

- EH70 valve sizes 1" and larger must be mounted in a horizontal pipe run with the solenoid vertical and on top. Other orientations will prevent proper operation.
- The valve must be mounted in the correct 'flow direction' as indicated by the arrow on the side of the valve body. The valve should be mounted with the high-pressure side piping at the back of the arrow (inlet) and the low-pressure side piping at the front of the arrow (outlet).
- This valve will not act as a check valve. It only blocks flow in the direction of inlet to outlet.
- Foreign matter such as particulates, PTFE tape, pipe dope, etc., can jam moving parts within the valve or clog very small orifices. The result can be a failure to open and/or close completely. Refer to the EH70 product manual.
- The operating pressure must not exceed the pressure rating on the valve nameplate.
- Verify that the power supplied to the solenoid matches the specification that is displayed on the valve nameplate.
- Check the coil leads for continuity. If there is no continuity or no resistance at all, the coil must be replaced.
- This valve is designed and tested for use with gases, water, and fluids with viscosity similar to water. Very viscous fluids may slow or inhibit operation.
- Contact the Clark Cooper Sales Department at info@magnatrol.com, or call 856-829-4580 for immediate assistance.