IF IN DOUBT ASK! THIRD ANGLE PROJECTION DO NOT SCALE DRAWING

INTRODUCTION
The STAR '...T...' range of Electro-Hydraulic Servo Valves are designed, manufactured and tested in compliance with ATEX and IECEx standards for use in explosive atmospheres. These devices provide position, velocity, pressure and force control in hydraulic systems and are available in a variety of manifold interfaces, coil ratings and electrical connections.

PRODUCT MARKINGS
Electrohydraulic Servovalves series '...T....' for Intrinsically Safe and Increased Safety (formerly type 'n', non-sparking)

Above code is prefixed with 3 or 4 digit model number based on required flow rate and hydraulic manifold preference:-

e.g. 455T....., 1550T....., 890T....., etc.

Code is also suffixed with 4 or 5 digit code to denote mechanical variations which do not affect certification.

When used in type of protection Intrinsic safety 'i' the appropriate box on the valve label to be permanently marked by the user. When used in Improved safety 'e' the appropriate box on the valve label to be permanently marked by the user. After use in type of protection 'e' the unit should not be used for protection type Intrinsic safety 'i'.

ATEX/IECEX CLASSIFICATION
The following certifications and protection concepts apply:-

Certificate No.: IECEx ITS 17.0015X
Certificate No.: CE 0359 ITS 17 ATEX 201792X
Certificate No.: CE ITS 17 ATEX 301793X
Ex II 1G Ex ia IIC/IIB T4 Ga
Ex II 3G Ex ec IIC T4/T3 Gc

IEC 60079-0, IEC 60079-7, IEC 60079-11, IEC 60079-14
ATEX Directive 2014/34/EU of the European Council

SAFETY NOTICE
The user is solely responsible for making final selection of components for use in explosive atmospheres, ensuring that all products carry the correct safety ratings.

Equipment suitable for ambient temperatures of -25°C to +85°C (T4) and -25°C to +120°C (T3).

For use in an application type of protection 'ec' the mating connector may only be disconnected when the circuit is confirmed de-energised or the location is known to be non-hazardous.

For use in an application type of protection 'ec' the supply current must not exceed 50mA dc.

For use in application type of protection Increased safety 'ec' and an ambient temperature >70°C appropriate heat resistant connector and/or trailing leads to be used.

Conditions of use intrinsic safety EPL Ga, when enclosure consists of machined aluminium alloy adequate protection must be applied so that in the rare event no ignitable sparks from friction, impact or grinding can be produced.

Ignition temperature of the hydraulic fluid > 150°C.

Equipment complies with 500 Vrms dielectric strength.

INSTALLATION
May be mounted in any orientation providing the valve and manifold interface porting, locating pin and fixing positions match. Mounting patterns for each model type are available at our website. Use high tensile fasteners and apply oil film to threads and apply the following torque values:-

8 Nm - M4 threads
12 Nm - M6 threads
15 Nm - M8 threads
25 Nm - M10 threads

Earth bonding should be made using a connection method that meets the EPL requirements of the location.

For improved safety 'e' flying lead connections to be terminated in an appropriate manner.

Set mechanical null or bias offset taking into account any electrical bias that may exist from any external drive amplifier.

MAINTENANCE
All electrical connections should be visually checked for damage . Do not allow deposits to build up on the surfaces that may cause loss in heat emission. Do not obscure markings with any coatings. If any signs of external damage or corrosion are detected then the device should be taken out of service.

DO NOT try to open or repair these devices. Only trained personnel are authorised to repair STAR products marked for use in hazardous locations.Unauthorised repair will immediately invalidate certification and rating.

TRANSPORT & SERVICE
Store in boxes and protect against moisture that may cause corrosion.

ELECTRICAL
For coils connected in series or individually:
Coil Signal Current (mA) = $\frac{\text{Nominal Rated Current [In]}}{\text{Number of Coils Driven}}$

For coils connected in parllel:
Coil Signal Current (mA) = Nominal Rated Current [In]

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Sheet1

STAR SERVO TECHNOLOGY
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| REV | DATE | APPROVER | CHANGE COMMENT |
|---|---|---|---|
| 01 | 06 Jun 17 | Roy Mountford | Released for Manufacture - Ex Approval |
| | | | |
| | | | |
| | | | |
| | | | |

MODEL FILE NAME:
MODEL CONFIGURATION:

MATERIAL: (SPECIFIED IN MODEL)
FINISH:

SEE BS 308 FOR EXPLANATION OF SYMBOLS AND GEOMETRIC TOLERANCES.

UNLESS OTHERWISE SPECIFIED:-
DIMENSIONS ARE IN MILLIMETRES.
THREADS TO BS 3643.
REMOVE ALL BURRS & BREAK SHARP EDGES MAX 0.25 RAD OR CHAMFER.

| | | |
|---|---|---|
| SURFACE FINISH | 1.6 µM Ra | |
| MACHINING: | ±0.25mm | ±1.0° |
| MACHINING BOXED: | [ ±0.10mm] | [ ±0.5° ] |
| FABRICATION: | ±2.0mm | ±2.0° |

STATUS: Released

| | |
|---|---|
| APPROVED BY: Roy Mountford | APPROVED DATE: 06 Jun 17 |
| CHECKED BY: Martin Gaze | CHECKED DATE: 17 Mar 17 |
| DRAWN BY: ChrisM | DRAWN DATE: 20 Feb 17 |

FILE NAME: EX003
DESCRIPTION: 2-STAGE EHSV MANUAL

| SIZE: | NUMBER: | REVISION: |
|---|---|---|
| ISO A3 420w x 297h | EX003 | 01 |

| SCALE: | SHEET: | WEIGHT: |
|---|---|---|
| 1:1 | 1 OF 4 | |

IF IN DOUBT ASK! THIRD ANGLE PROJECTION DO NOT SCALE DRAWING

| COIL PARAMETERS | | | | | | |
|---|---|---|---|---|---|---|
| Coil PN | Coil Connection Mode | d.c. Coil Resistance (nom) (Ω) | Ui /Umax (V) | Ii /Imax (mA) | Li (mH) | Eff. Inductance (mH) |
| SRS3140 | single coil | 80 | 30 | 26 | 48 | 0 |
| SRS3141 | | 200 | 30 | 19 | 85 | 0 |
| SRS3139 | | 1000 | 30 | 37 | 24 | 0 |
| SRS3118 | | 1000 | 30 | 28 | 38 | 0 |
| SRS3140 | parallel coil | 40 | 30 | 26 | 46 | 0 |
| SRS3141 | | 100 | 30 | 19 | 88 | 0 |
| SRS3139 | | 500 | 30 | 20 | 87 | 0 |
| SRS3140 | series coil | 160 | 30 | 18 | 89 | 0 |
| SRS3141 | | 400 | 30 | 12.7 | 200 | 0 |
| SRS3139 | | 2000 | 30 | 10 | 280 | 0 |

| ENTITY PARAMETERS Ex ia IIC/IIB | | | | |
|---|---|---|---|---|
| Coil & Connection Mode | Gas Group | Ui | Ii | Li |
| SRS3118 single | IIC | 16 V | 160 mA | 6mH |
| SRS3118 single | IIC | 24 V | 85 mA | 5mH |
| SRS3118 single | IIC | 30 V | 28 mA | 39mH |
| SRS3118 parallel | IIC | 30 V | 28mA | 39mH |
| SRS3118 series | IIC | 30 V | 14mA | 158mH |
| | | | | |
| SRS3139 single | IIC | 16 V | 160 mA | 6mH |
| SRS3139 single | IIC | 24 V | 85 mA | 5mH |
| SRS3139 single | IIC | 30 V | 37 mA | 24mH |
| SRS3139 parallel | IIC | 30 V | 20 mA | 87mH |
| SRS3139 series | IIC | 30 V | 10 mA | 288mH |
| | | | | |
| SRS3140 single, series, parallel | IIB | 12 V | 120 mA | 10mH |
| SRS3140 single, parallel | IIC | 30 V | 26 mA | 48mH |
| SRS3140 series | IIC | 30 V | 18 mA | 89mH |
| | | | | |
| SRS3141 single, series, parallel | IIB | 12 V | 240 mA | 2.5mH |
| SRS3141 single, parallel | IIC | 30 V | 19 mA | 86mH |
| SRS3141 series | IIC | 30 V | 13 mA | 199mH |

| EXAMPLE BARRIER SELECTION 'Ex ia' | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Barrier Details | | | | | Coil Details | | | | | | Gas Group |
| Barrier Part No. | Uo (V) | Io (mA) | Po (mW) | Rmax (Ω) REF | Coil Part No's | Max Coil Resistance at 20 °C (nom+10%) (Ω) | Coil Connection Mode/s | Max Connection Mode Resistance (Ω) | *Connection Mode Nominal Drive Current (mA) | Maximum posible current that can be driven through coil/s connected to barrier at 20 °C (mA) | |
| STAHL 9001/02-133-150-101 | 13.3 | 150 | 498.8 | 115 | SRS3118 | 1100 | SINGLE | 1100 | 8 | 10.9 | IIC |
| | | | | | | | MULTI SINGLE | 1100 | 8 / #Coils | 10.9 | IIC |
| | | | | | SRS3139 | 1100 | SINGLE | 1100 | 8 | 10.9 | IIC |
| | | | | | | | MULTI SINGLE | 1100 | 8 / #Coils | 10.9 | IIC |
| | | | | | | | PARALLEL | 1100 | 8 | 10.9 | IIC |
| | | | | | | | SERIES | 2200 | 4 | 5.7 | IIC |
| | | | | | | | | | | | |
| STAHL 9001/02-093-075-101 | 9.3 | 75 | 174.4 | 390 | SRS3140 | 88 | SINGLE | 88 | 40 | **19.5 | IIB |
| | | | | | | | MULTI SINGLE | 88 | 40 / #Coils | **19.5 | IIB |
| | | | | | | | PARALLEL | 44 | 40 | **21.4 | IIB |
| | | | | | | | SERIES | 176 | 20 | **16.4 | IIB |
| | | | | | SRS3141 | 220 | SINGLE | 220 | 15 | 15.2 | IIB |
| | | | | | | | MULTI SINGLE | 220 | 15 / #Coils | 15.2 | IIB |
| | | | | | | | PARALLEL | 110 | 15 | 0.0 | IIB |
| | | | | | | | SERIES | 440 | 7.5 | 11.2 | IIB |
| | | | | | SRS3118 | 1100 | SINGLE | 1100 | 8 | **6.2 | IIC |
| | | | | | | | MULTI SINGLE | 1100 | 8 / #Coils | **6.2 | IIC |
| | | | | | SRS3139 | 1100 | SINGLE | 1100 | 8 | **6.2 | IIC |
| | | | | | | | MULTI SINGLE | 1100 | 8 / #Coils | **6.2 | IIC |
| | | | | | | | PARALLEL | 1100 | 8 | **6.2 | IIC |
| | | | | | | | SERIES | 2200 | 4 | **3.6 | IIC |
| | | | | | | | | | | | |
| STAHL 9001/02-093-150-101 | 9.3 | 150 | 348.8 | 80 | SRS3140 | 88 | SINGLE | 88 | 40 | 55.4 | IIB |
| | | | | | | | MULTI SINGLE | 88 | 40 / #Coils | 55.4 | IIB |
| | | | | | | | PARALLEL | 44 | 40 | 0.0 | IIB |
| | | | | | | | SERIES | 176 | 20 | 36.3 | IIB |
| | | | | | SRS3141 | 220 | SINGLE | 220 | 15 | 31 | IIB |
| | | | | | | | MULTI SINGLE | 220 | 15 / #Coils | 31 | IIB |
| | | | | | | | PARALLEL | 110 | 15 | 48.9 | IIB |
| | | | | | | | SERIES | 440 | 7.5 | 17.9 | IIB |
| | | | | | SRS3118 | 1100 | SINGLE | 1100 | 8 | **7.9 | IIC |
| | | | | | | | MULTI SINGLE | 1100 | 8 / #Coils | **7.9 | IIC |
| | | | | | SRS3139 | 1100 | SINGLE | 1100 | 8 | **7.9 | IIC |
| | | | | | | | MULTI SINGLE | 1100 | 8 / #Coils | **7.9 | IIC |
| | | | | | | | PARALLEL | 1100 | 8 | **7.9 | IIC |
| | | | | | | | SERIES | 2200 | 4 | 4.1 | IIC |

* Nominal drive current is the current required to drive the valve to full flow in DC current conditions for the given 'Coil Connection Mode'.
** This combination of barrier and coil will not allow the valve to be driven fully open for the nominal coil rate when driving only a single coil.

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Sheet2

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MODEL FILE NAME:
MODEL CONFIGURATION:

MATERIAL: (SPECIFIED IN MODEL)
FINISH:

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UNLESS OTHERWISE SPECIFIED:-
DIMENSIONS ARE IN MILLIMETRES.
THREADS TO BS 3643.
REMOVE ALL BURRS & BREAK SHARP EDGES MAX 0.25 RAD OR CHAMFER.

| | | |
|---|---|---|
| SURFACE FINISH | 1.6 µM Ra | |
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| MACHINING BOXED: | [ ±0.10mm] | [ ±0.5° ] |
| FABRICATION: | ±2.0mm | ±2.0° |

STATUS: Released

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| 2:1 | 2 OF 4 | |

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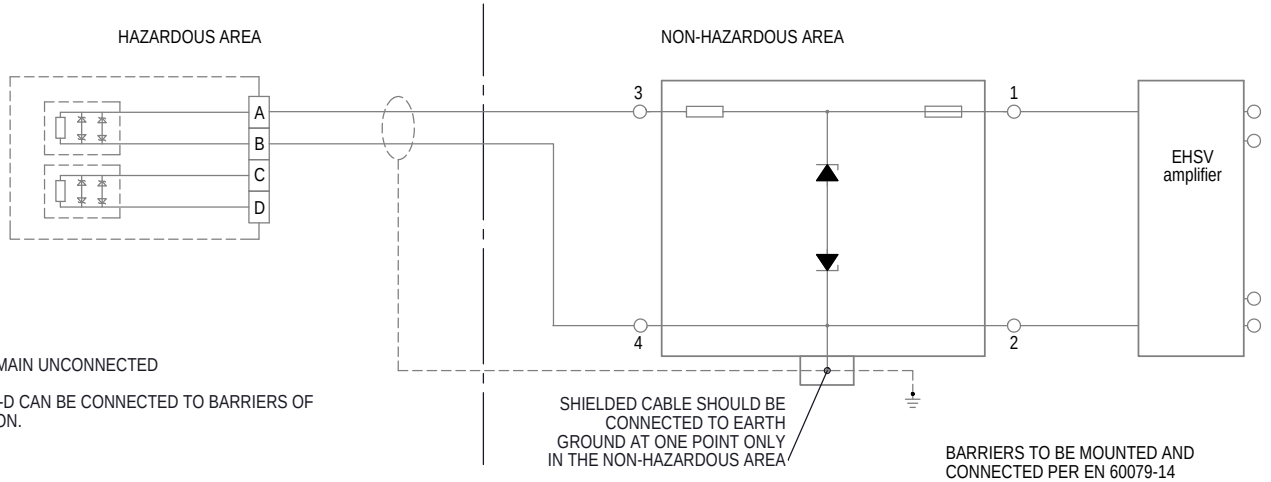


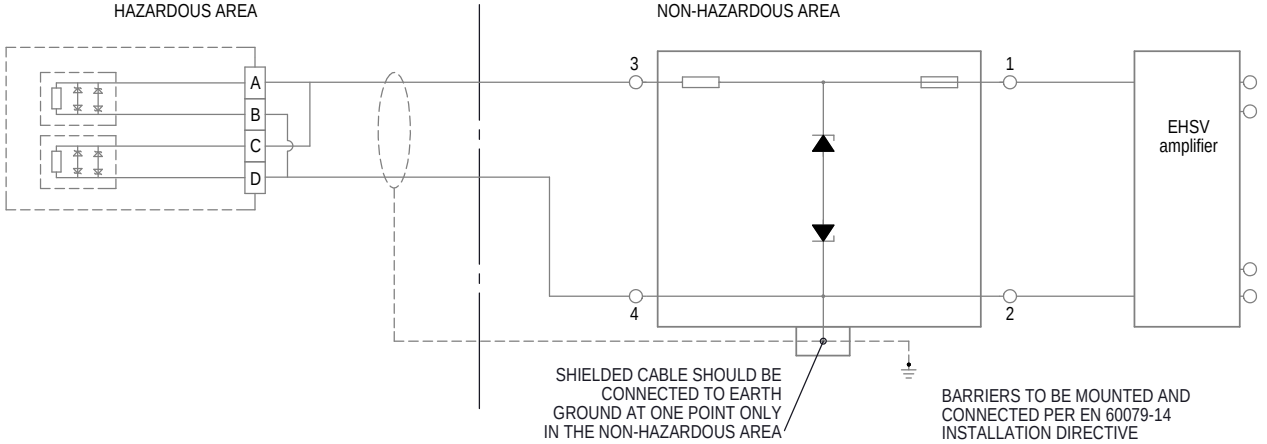


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| 1:2 | 3 OF 4 | |

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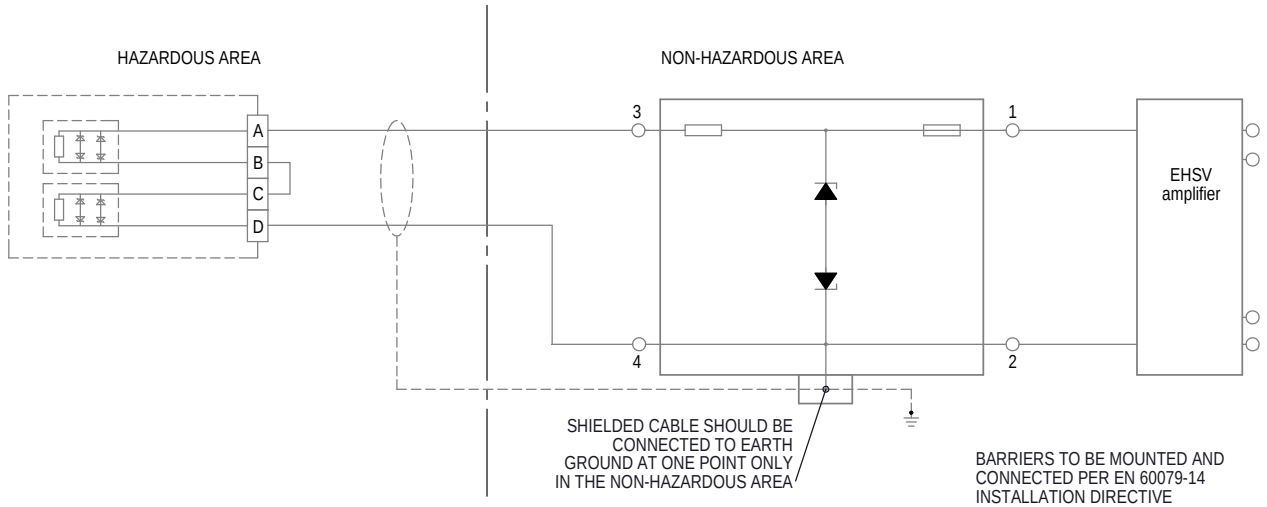


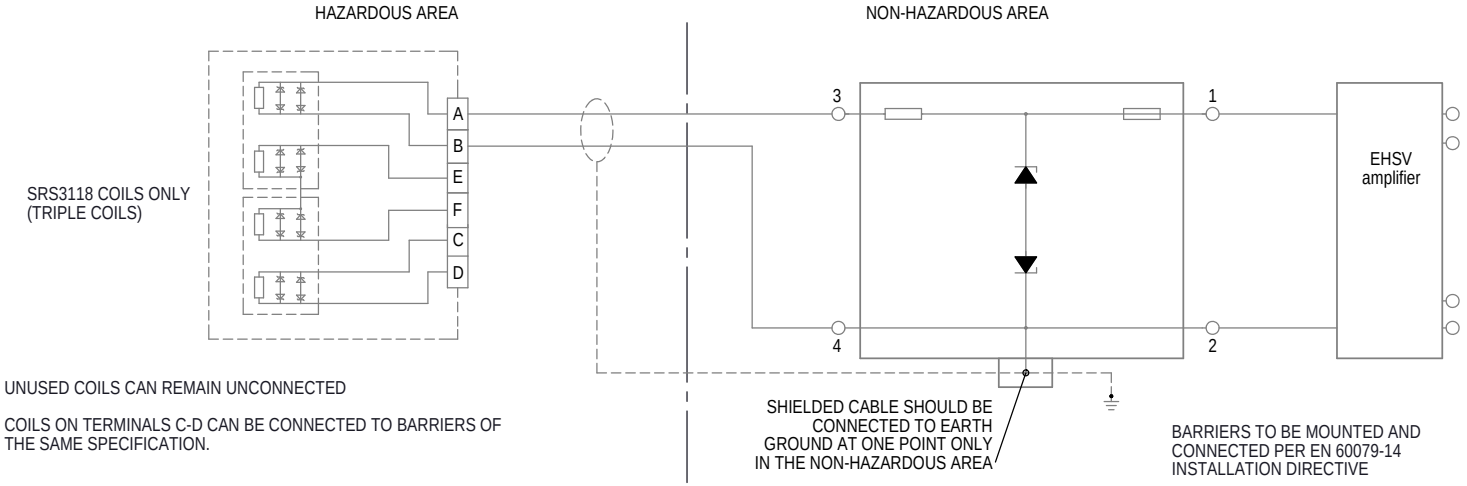


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| 1:2 | 4 OF 4 | |