HYDAC INTERNATIONAL

X-Series
Electromechanical CAN actuator

ICU
Intelligent Control Unit

EN 5.296.0/10.23

General information and functional description

The Intelligent Control Unit (ICU) is an electromechanical CAN bus controlled actuator unit for hysteresis-free position control of mobile valve spools. The direct spool actuation ensures high precision, dynamics and reliability, even at low fluid temperatures. The independency of pilot oil supply allows energy efficient system layouts.

With its intelligent software, ICU detects unintended use or sticking spools. It continuously monitors the condition and ensures the safe state of the valve, which can either be the spring centered neutral position or the spool‘s last position.

Developed for the use under the most demanding operating conditions, the ICU exceeds the requirements of the highest standards and is able to control safety relevant functions reliably.

Product features

EC-motor actuation ensures valve with …

- High precision due to high resolution
- Fast step response
- No hysteresis
- No pilot oil supply required
- No spool sealing required
- Contamination resistant actuator

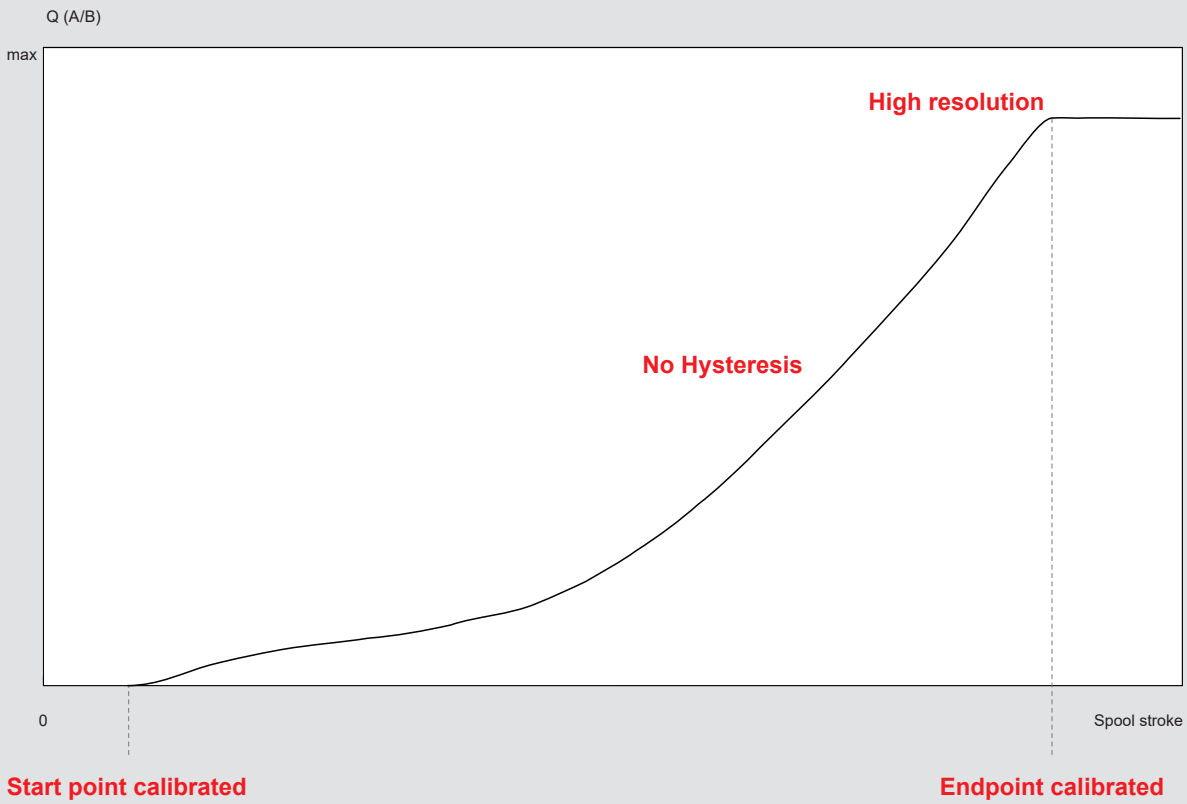
Outperforming demanding standards such as…

- ISO 16750-1 to 5: Electrical, mechanical, climatic and chemical loads
- DIN EN 60068-2: Tests A, B, Fc, N, Ea and Db (cold, dry heat, sinusoidal vibration, change of temperature, shock, cyclic damp heat)
- DIN EN 60529:2014: High-pressure cleaning, temporary submerging tests

Intelligent electronics provide…

- Closed loop control of valve spool with position feedback
- Smart error management
- Start- and end point calibration ex works
- Very low power consumption in standby mode with wakeup on K15
- Integrated temperature sensors

Exemplary valve characteristic curve

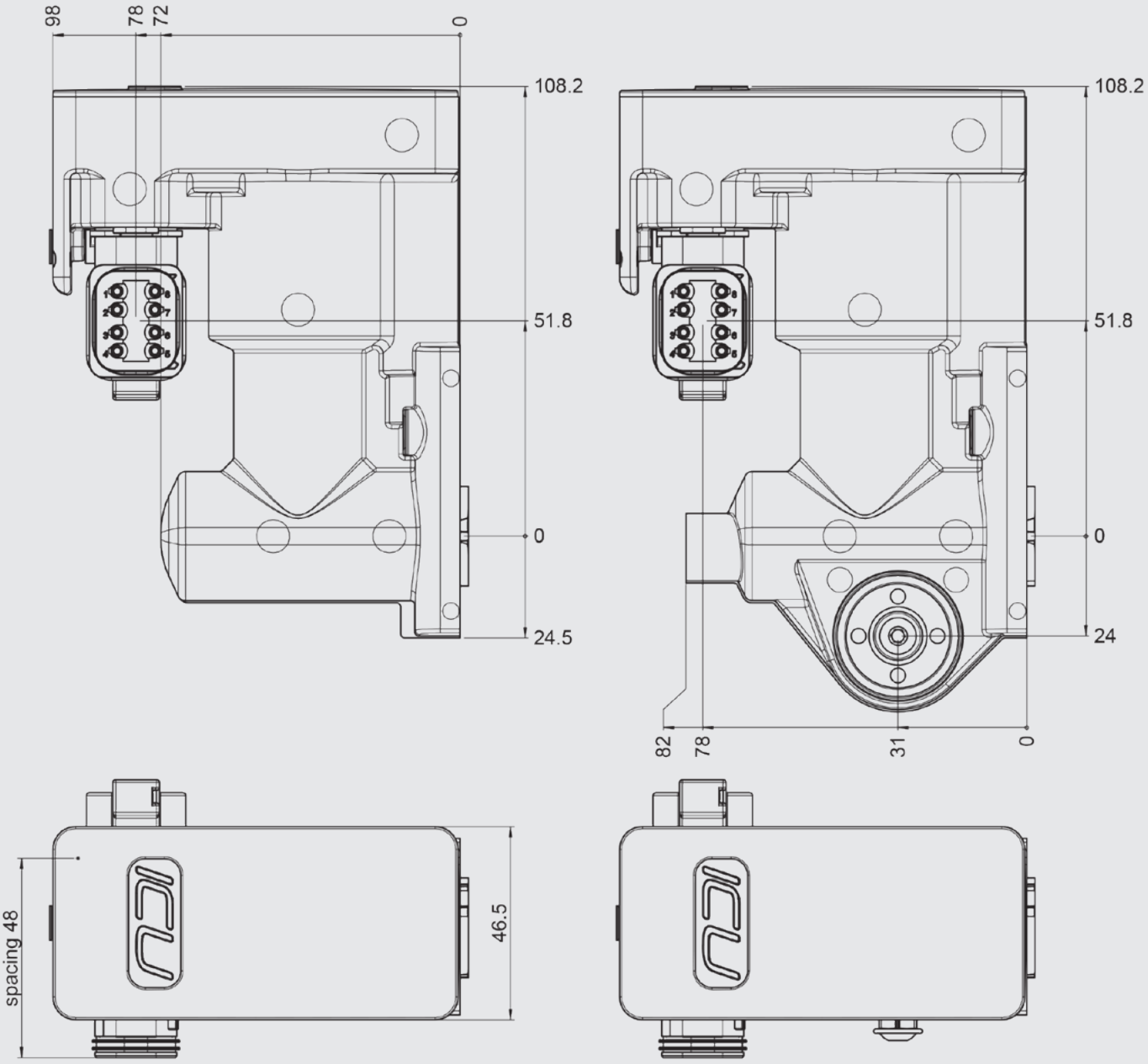


Dimensions

IC / IS-Version

ICH / ISH-Version

(Figures show optional Main connector)



Technical data

General data and operating conditions	
Available versions	IC / ICH: CAN operation via J1939 or CANopen with (ICH) or without (IC) hand lever IS / ISH: CAN operation with advanced CANopen (PLX) for safety relevant applications with (ISH) or without (IS) hand lever
Mass	IC/IS: 660g | ICH/ISH: 730g
Spool stroke	max. 22 mm
Accuracy of position control	<10 µm
Step response time	<100 ms (depending on spool stroke, viscosity and electrical system
Ambient temperature range	-40 … +85 °C
Corrosion protection	Anodization of housing, ZnNi-plating of hand lever axis, A4 screws
Hydraulic data	
Maximum tank pressure	10 bar static, 30 bar peak
Hydraulic fluid	Mineral oil (HL / HLP) acc. to DIN 51524, other hydraulic fluids on inquiry
Viscosity range	10 – 400 mm²/s (2.000 mm²/s for cold start with reduced velocity)
Hydraulic fluid temperature range	-25 … +85 °C
Electrical data	
Supply voltage U_V	9 – 32 V (nominal 12 or 24 V)
Power consumption (24V)	During movement: 16 W average, 42 W peak Full load holding: < 4 W Standby (K15 low) < 24 mW Standby (K15 high) < 1,5 W
Connector type	Deutsch DT06-08SA Optional axial chaining with main connector
Connector IP protection class	Up to IP67 and IP6K9K
Communication	
CAN protocol	HYDAC MATCH, J1939, CANopen, advanced CANopen (PLX)
Diagnostic interface	Hydac Machine Service Tool (MST), UDS
Further information available via CAN	Spool position

Functional Safety	IC / ICH	IS / ISH
Fatigue Lifetime (B10)	10 Mio. cycles	
Diagnostic Coverage (DCavg)	88%	96,3%
Performance Level DIN EN ISO 13849:2015	up to Category 2, PLc	up to Category 2, PLd
Safety Integrity Level DIN EN 61508:2010	up to SIL 1	up to SIL 2

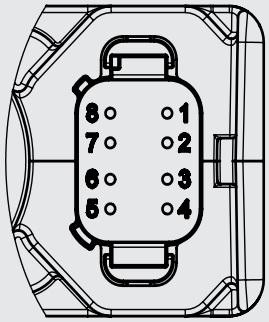
CANopen®

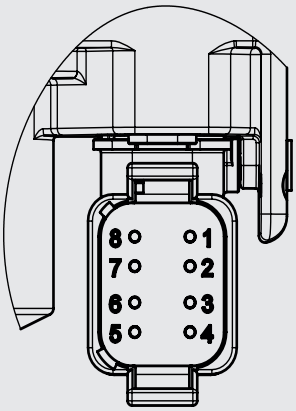
MATCH BY HYDAC

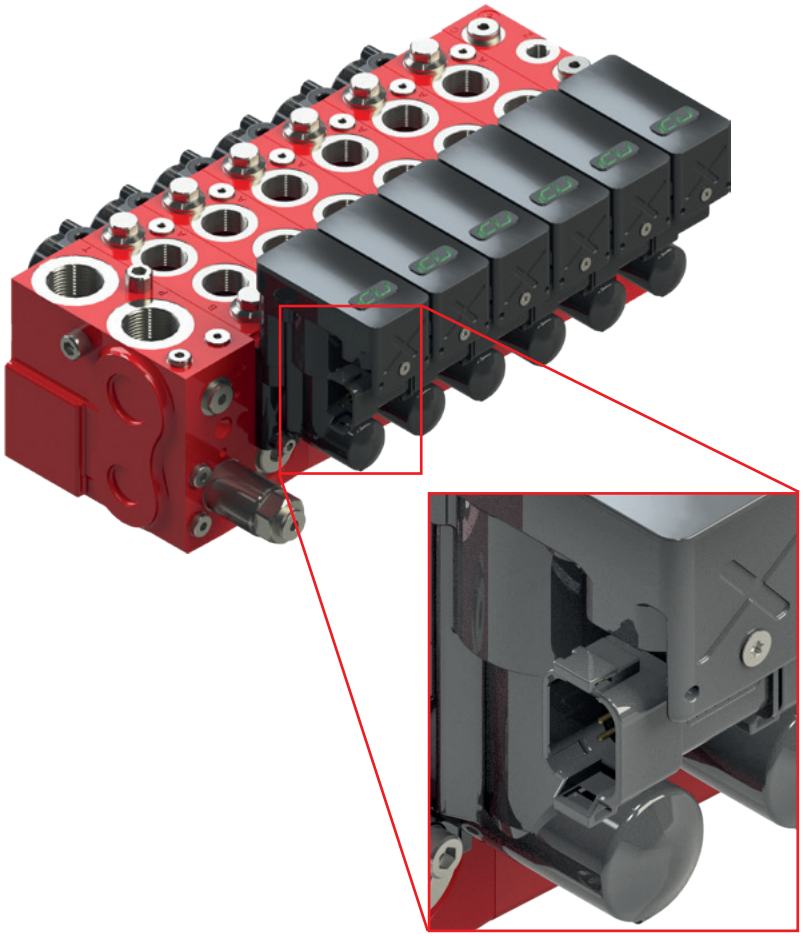
Electrical connection

ICU connector
1: CAN_H
2: -
3: GND
4: U_V
5: -
6: Ident-OUT
7: Ident-IN / K15
8: CAN_L

Main connector
1: CAN_H
2: -
3: GND
4: U_V
5: U_V
6: GND
7: Ident-IN / K15
8: CAN_L



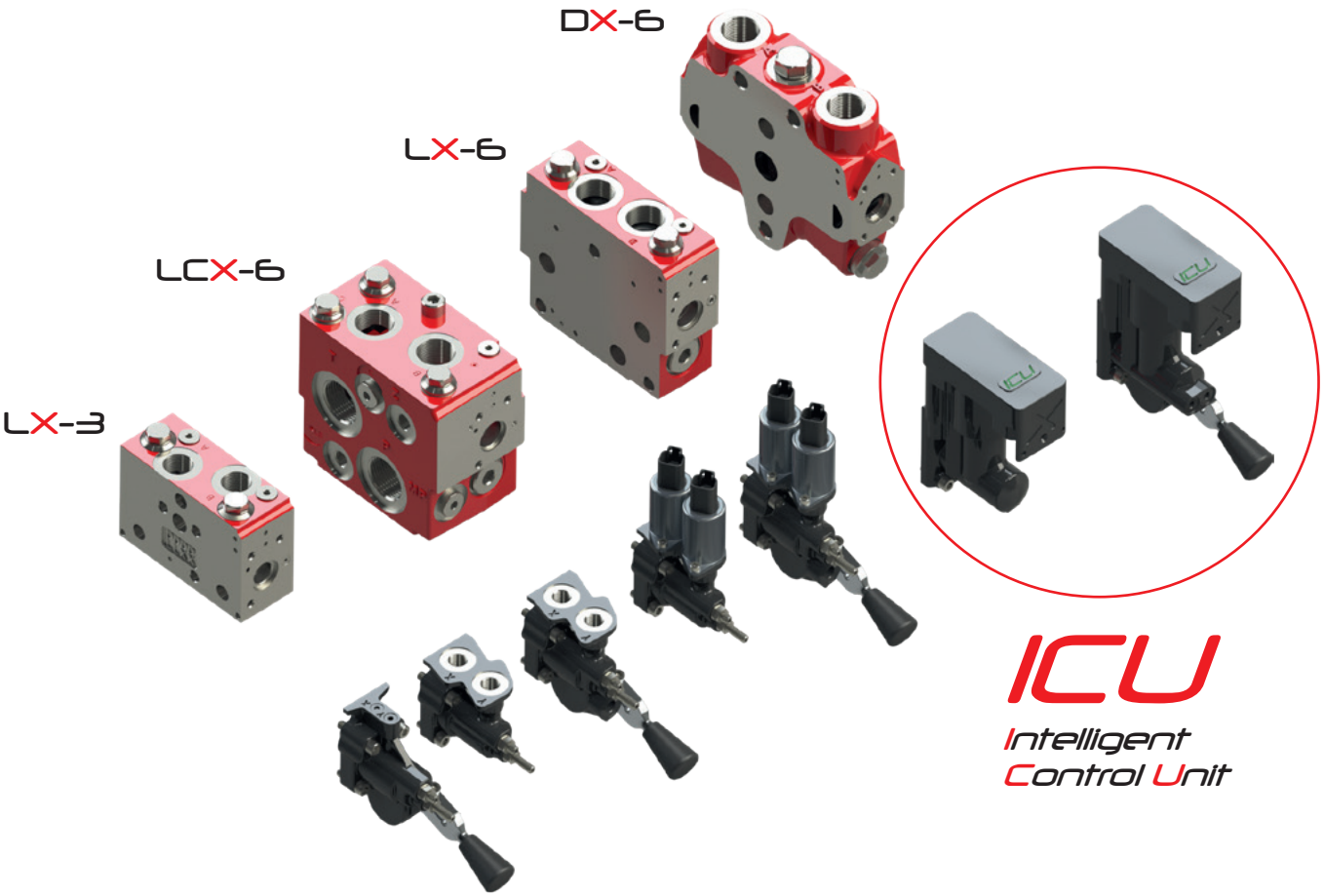




Main connector

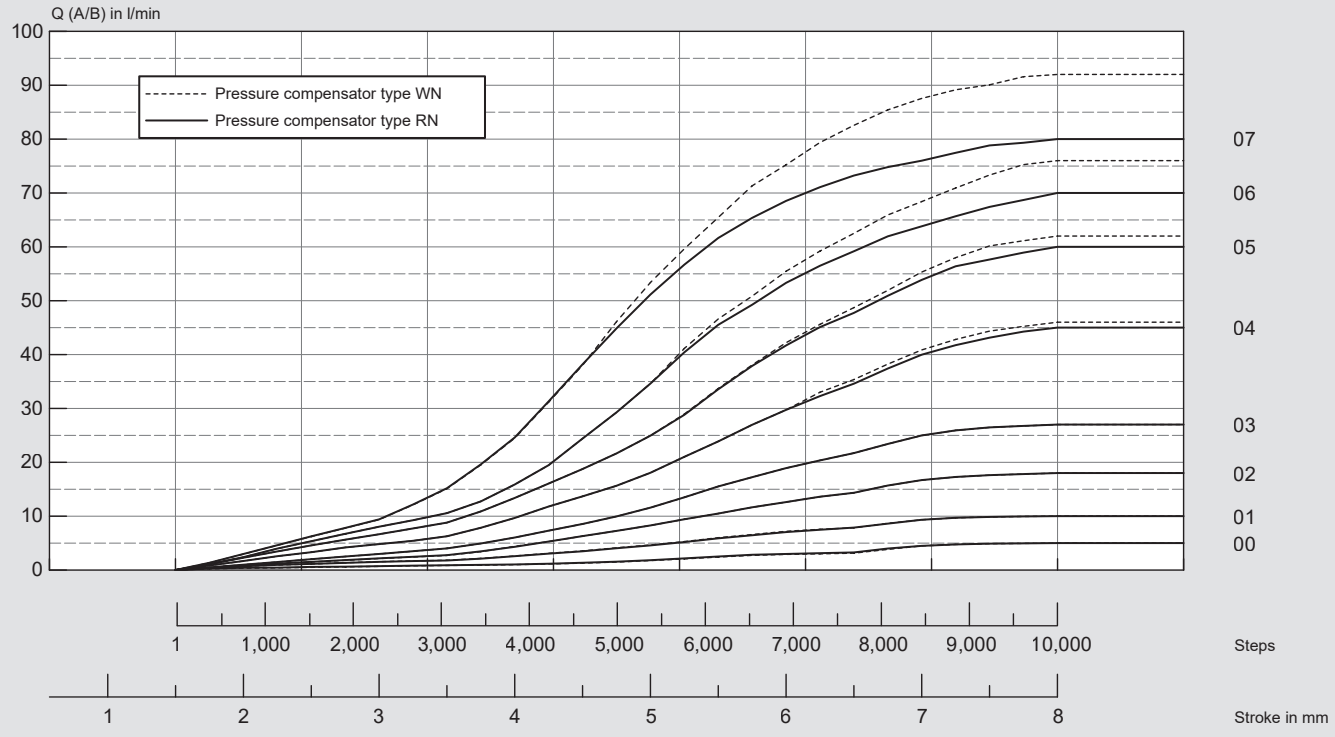
Seamless integration with X-Series valves

The ICU has been developed to be seamlessly integrated into the universal portfolio of operation units for the X-Series valves. Together with hydraulic and electro-hydraulic operation units, the ICU completes the available options by adding an electro-mechanical CAN actuator.



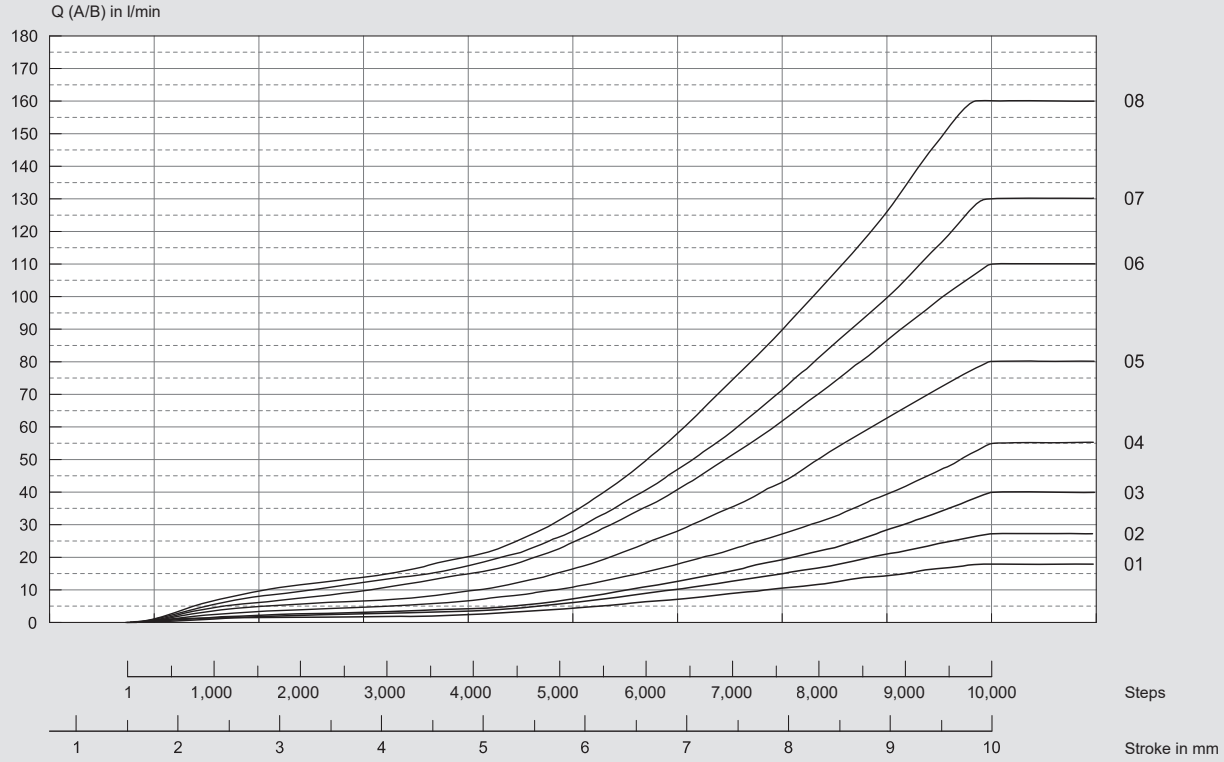
LX-3 characteristic curves

Characteristic curves for nominal flow rates of main spool (measured at 32 mm²/s)

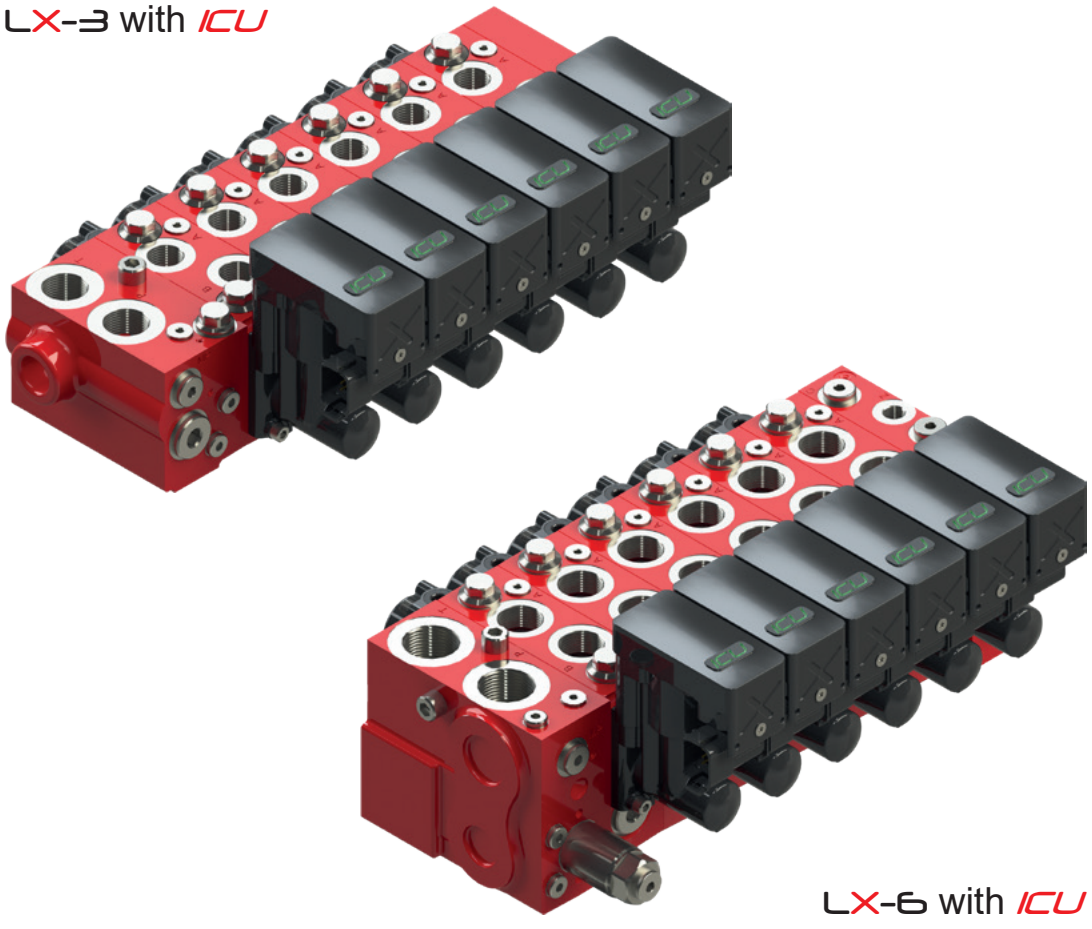


LX-6 characteristic curves

Characteristic curves for nominal flow rates of main spool (measured at 32 mm²/s)



LX-3 with ICU



LX-6 with ICU

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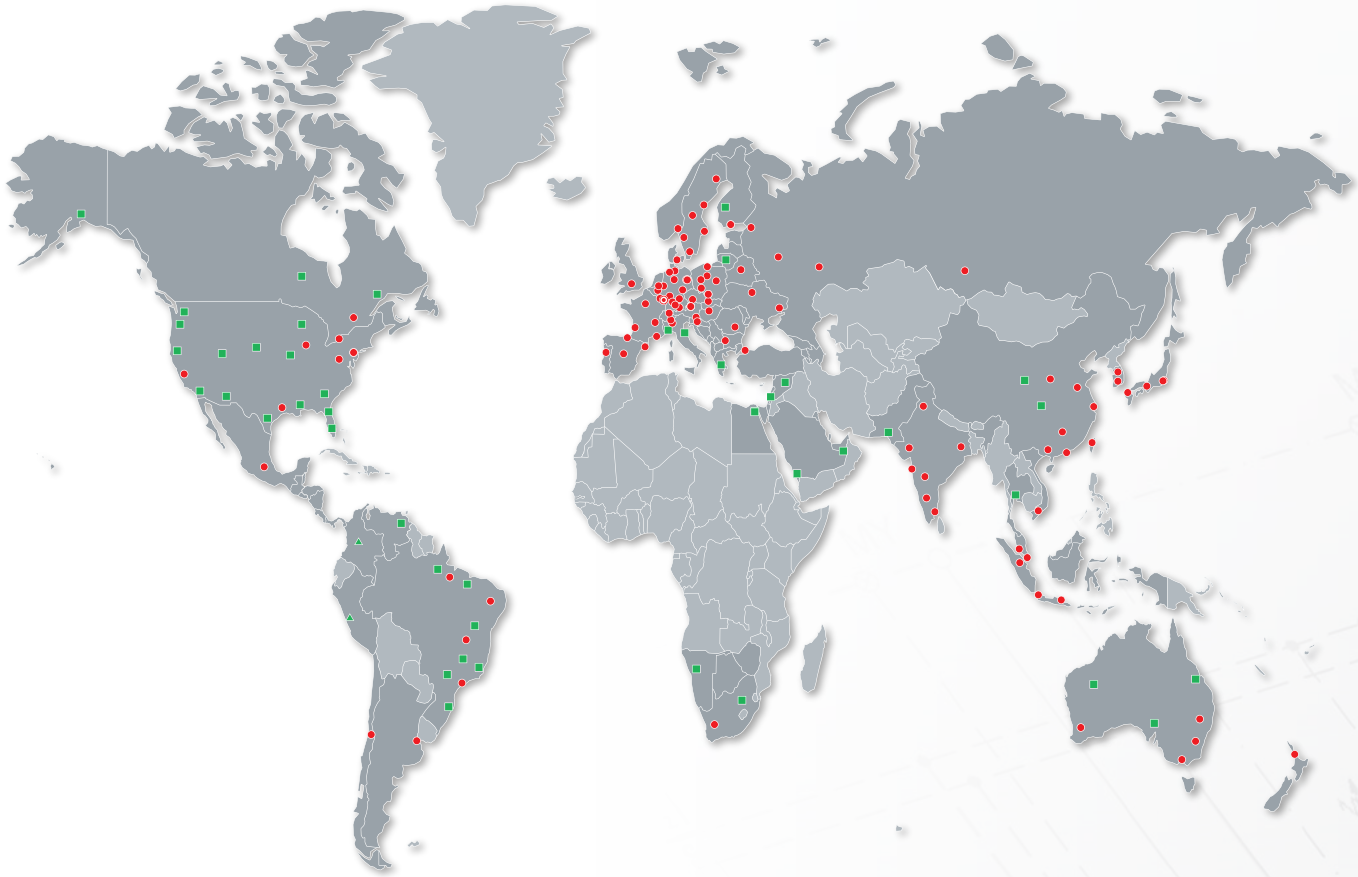

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Note

The information in this brochure relates to the operating conditions and applications described. For applications and / or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

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