Valve Remote Control

Technical Datasheets

Scana Skarpenord
Hydraulic actuator, double acting

Type: 1/4 turn hydraulic actuator
RA2 - Mechanical locking
RB2 - Adjustable stroke

- Scotch-yoke design, piston type
- Local visual position indicator
- Manual operation by stationary hand pump or by portable hand pump via quick connectors
- Connection flange according to ISO 5211

Max hydraulic working pressure 220 bar
Actuator torque range 69 - 64550 Nm
Service temperature -45°C to +120°C

Use area: For dry and submerged purpose (for submerged type “SBM” a seal connection kit is added).

<table>
<thead>
<tr>
<th>PART NAME</th>
<th>MATERIAL</th>
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<tbody>
<tr>
<td>CENTRAL BODY, DRIVE FORK</td>
<td>NODULAR CAST IRON</td>
</tr>
<tr>
<td>CYLINDER</td>
<td>NODULAR CAST IRON/ CARBON STEEL</td>
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</table>
### Output torques

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<thead>
<tr>
<th>ACTUATOR TYPE NO.</th>
<th>OUTPUT TORQUE (NM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA2 - mechanical lock</td>
<td>at 100 bar</td>
</tr>
<tr>
<td>RX2 05 H1 0 A</td>
<td>Break 69, Run 42</td>
</tr>
<tr>
<td>RX2 07 H1 0 A</td>
<td>Break 139, Run 83</td>
</tr>
<tr>
<td>RX2 10 H1 0 A</td>
<td>Break 278, Run 167</td>
</tr>
<tr>
<td>RX2 12 H1 0 A</td>
<td>Break 556, Run 333</td>
</tr>
<tr>
<td>RX2 14 H1 0 A</td>
<td>Break 1111, Run 667</td>
</tr>
<tr>
<td>RX2 16 H1 0 A</td>
<td>Break 2222, Run 1333</td>
</tr>
<tr>
<td>RX2 16 H3 0 B</td>
<td>Break 3100, Run 1860</td>
</tr>
<tr>
<td>RX2 25 H1 0 A</td>
<td>Break 4444, Run 2667</td>
</tr>
<tr>
<td>RX2 25 H3 0 B</td>
<td>Break 6249, Run 3749</td>
</tr>
<tr>
<td>RX2 30 H1 0 A</td>
<td>Break 8889, Run 5333</td>
</tr>
<tr>
<td>RX2 30 H3 0 B</td>
<td>Break 12099, Run 7259</td>
</tr>
<tr>
<td>RX2 35 H1 0 A</td>
<td>Break 17778, Run 10667</td>
</tr>
<tr>
<td>RX2 35 H3 0 B</td>
<td>Break 24606, Run 14764</td>
</tr>
<tr>
<td>RX2 40 H1 0 A</td>
<td>Break 35556, Run 21333</td>
</tr>
<tr>
<td>RX2 40 H3 0 B</td>
<td>Break 49660, Run 29796</td>
</tr>
</tbody>
</table>

### Dimensions

![Diagram of actuator dimensions](image)

<table>
<thead>
<tr>
<th>ACTUATOR TYPE</th>
<th>DIMENSIONS (MM)</th>
<th>WEIGHT (KG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RX2 05 H1 0 A</td>
<td>A 262, B 132, C 94, D 73</td>
<td>7</td>
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<tr>
<td>RX2 07 H1 0 A</td>
<td>A 326, B 150, C 102, D 82</td>
<td>8.5</td>
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<tr>
<td>RX2 10 H1 0 A</td>
<td>A 378, B 184, C 114, D 102</td>
<td>14</td>
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<tr>
<td>RX2 12 H1 0 A</td>
<td>A 435, B 202, C 124, D 105</td>
<td>22</td>
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<tr>
<td>RX2 14 H1 0 A</td>
<td>A 542, B 240, C 134, D 121</td>
<td>33</td>
</tr>
<tr>
<td>RX2 16 H1 0 A</td>
<td>A 744, B 306, C 204, D 147</td>
<td>80</td>
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<tr>
<td>RX2 16 H3 0 B</td>
<td>A 842, B 325, C 209, D 147</td>
<td>95</td>
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<tr>
<td>RX2 25 H1 0 A</td>
<td>A 880, B 367, C 244, D 174</td>
<td>147</td>
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<tr>
<td>RX2 25 H3 0 B</td>
<td>A 984, B 383, C 244, D 174</td>
<td>152</td>
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<tr>
<td>RX2 30 H1 0 A</td>
<td>A 1004, B 450, C 304, D 215</td>
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<tr>
<td>RX2 30 H3 0 B</td>
<td>A 1240, B 480, C 304, D 215</td>
<td>285</td>
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<tr>
<td>RX2 35 H1 0 A</td>
<td>A 1390, B 672, C 251, D 336</td>
<td>383</td>
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<tr>
<td>RX2 35 H3 0 B</td>
<td>A 1382, B 683, C 258, D 344</td>
<td>395</td>
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<tr>
<td>RX2 40 H1 0 A</td>
<td>A 1620, B 808, C 301, D 404</td>
<td>642</td>
</tr>
<tr>
<td>RX2 40 H3 0 B</td>
<td>A 1740, B 540, C 301, D 415</td>
<td>642</td>
</tr>
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Hydraulic actuator, single acting

Type: 1/4 turn hydraulic actuator
RE2 - Spring-to-close action
RF2 - Spring-to-open action

- Scotch-yoke design, piston type
- Adjustable stroke
- Local visual position indicator
- Stationary hand pump or quick connectors for portable hand pump
- Connection flange according to ISO 5211

Available torque up to 17800 Nm (Larger actuators on request)
Service temperature -45°C to +120°C

Use area: For dry and submerged purpose (for submerged type “SBM” a seal connection kit is added).

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<td>SPRING HOUSE</td>
<td>NODULAR CAST IRON/ CARBON STEEL</td>
</tr>
<tr>
<td>HELICOIL SPRING</td>
<td>SPRING WIRE</td>
</tr>
<tr>
<td>TOP COVER</td>
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<tbody>
<tr>
<td></td>
<td>AT 100 BAR</td>
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<tr>
<td>RE2 - SPRING-TO-CLOSE</td>
<td>RX2.. H5 5 B</td>
</tr>
<tr>
<td>RX2 05 H.. B</td>
<td>69</td>
</tr>
<tr>
<td>RX2 07 H.. B</td>
<td>163</td>
</tr>
<tr>
<td>RX2 10 H.. B</td>
<td>315</td>
</tr>
<tr>
<td>RX2 12 H.. B</td>
<td>572</td>
</tr>
<tr>
<td>RX2 14 H.. B</td>
<td>1154</td>
</tr>
<tr>
<td>RX2 16 H5 5 B</td>
<td>2833</td>
</tr>
<tr>
<td>RX2 16 H.. B</td>
<td>3794</td>
</tr>
<tr>
<td>RX2 25 H.. B</td>
<td>6856</td>
</tr>
<tr>
<td>RX2 30 H.. B</td>
<td>15582</td>
</tr>
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</table>

Dimensions

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<tr>
<th>ACTUATOR TYPE</th>
<th>DIMENSIONS (MM)</th>
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</table>
y=7: for 13 Mpa |                 |             |
y=5: for 18 Mpa |                 |             |
| Rx2 05 Hy 1 B | A 500 B 98 C 334 D 170 E 146 F 94 G 73 H 33 | 14          |
| Rx2 07 Hy 1 B | A 552 B 109 C 354 D 188 E 149 F 104 G 82 H 30 | 21          |
| Rx2 10 Hy 1 B | A 740 B 122 C 518 D 223 E 162 F 114 G 102 H 42 | 42          |
| Rx2 12 Hy 1 B | A 900 B 138 C 649 D 263 E 220 F 124 G 105 H 55 | 65          |
| Rx2 14 Hy 1 B | A 1104 B 163 C 791 D 323 E 275 F 134 G 125 H 78 | 120         |
| Rx2 16 Hy 1 B | A 1325 B 180 C 925 D 454 E 366 F 209 G 159 H 88 | 300         |
| Rx2 25 Hy 1 B | A 2206 B 205 C 1714 D 490 E 366 F 244 G 174 H 68 | 410         |
| Rx2 30 Hy 1 B | A 2383 B 255 C 1762 D 543 E 416 F 304 G 215 H 63 | 670         |
Emergency connection blocks

Connection block with blocking valves and quick connectors for portable hand pump.
Standard material: seawater resistant brass (optional AISI 316).

**For in-line mounting**
- Mounted in hydraulic lines, on deck etc.
- For submerged actuators or for actuators where connection of portable hand pump is not suitable.

**For actuator mounting**
- Mounted on the actuator when accessible for connection of portable hand pump.
Hand pumps for emergency operation

Portable hand pump

- Connection to Solenoid Valve Cabinet or to emergency blocks mounted on actuator or on deck
- Mounted on frame for easy transport and operation
- 2 x 3m flexible hoses with quick couplings
- 2 x Manometers for pressure indication
- 3 litre oil reservoir
- Up to 250 bar pressure
- Dry weight 13 kg

Stationary hand pump

- To be mounted directly on the actuator, on bulkhead or in watertight box on deck
- Control valve for direction control
- 2 x Isolation valves
- 2 x Manometers for pressure indication
- 1 litre oil reservoir
- Dry weight 8.5 kg

Hand pump central

- To be mounted on bulkhead or in watertight box on deck
- Controls up to 6 actuators from one hand pump central
- Control valve for direction control and up to 6 pairs of isolation valves
- 2 x Manometers for pressure indication
- 1 litre oil reservoir
- Dry weight 35 kg (for 6 actuators)
Valve position indication

Visual indicator mounted on actuator
- Directly mechanically linked to the valve stem
- Indicator follows movement of valve disc
- Exposed parts available in brass or stainless steel
- Available with indicator flag of stainless steel

Direct indication - position indicator box mounted on actuator
- Box of stainless steel AISI 316
- Protection grade IP68
- Two microswitches with potential free contacts or inductive contacts
- Potentiometer or position indicator with signal converter 4-20 mA
- Visual indicator on top of the box mechanically linked to the valve stem
- Available with indicator flag of stainless steel
Indirect Open/Close indication
Flow switch indicator installed in Solenoid valve cabinet

Open/Close indication based on monitoring the flow in the lines to the actuator. Positive feedback on actuator movement by indication of flow in return line. No additional cabling to actuator needed.

See datasheet Control Circuit D22 and S22 for details.

Indirect continuous indication
Volumetric indicator installed in Solenoid valve cabinet

Continuous indication by measuring the oil volume distributed to/from the actuator by using a volumetric indicator. Pressure and temperature independent. No additional cabling needed.

See datasheet Control Circuit D36 for details.
The Control Station (PC), Logic Controller (PLC) and operator panel in SVC are interconnected by a bus cable. This will simplify the installation work. All control components are produced by renowned companies with worldwide technical support.

Valve Control Station for control room:
- Control computer station with onscreen mimics for easy operation.
- Operation by pointing device or touch screen to activate any valve.
- Position/status indicated on mimic.
- Computer stations and operator panels allow parallel operation from different locations.
- Alarm system with logging of alarms and printer support may easily be added.

Remote control/monitoring of HPU:
- Monitoring and control of hydraulic power unit from mimic screen on computer station.
- Alarms, warnings and hydraulic oil pressure visualized and logged.

Pump control:
- Control and monitoring of pumps from the onscreen mimic.
- Pump status, power consumption and pressures may be displayed onscreen.

Data from external systems:
- Valve control station may be connected to any external system for visualizing data.
- Interface with other systems by standard or tailor made protocols.

Solenoid Valve Cabinet:
- I/O units and PLC located in SVC.
- The PLC utilizes a NC common alarm dry contact for connection to ships IAS.
- The logic controller in the SVC runs independently from the control room computer and has a dedicated operator panel mounted in cabinet door.
- The control system will still run from the operator panel, even if the control computer is disabled.
- The operator panel utilizes a powerful tool for maintenance work and as a back-up control station.
Hydraulic Power Unit

HPU 120: 120l oil reservoir
HPU 250: 250l oil reservoir
Hydraulic working pressure 50-140 bar
Gearpumps, capacities 6,8l/min or 9,2l/min @60Hz
One pump (selectable) in operation, one stand-by
El. motors from 400 to 480 VAC, 50 or 60 Hz, from 1,8kW to 2,6kW at 60Hz. Isolation class F, IP55
32l bladder accumulator
Filter in return line
Alarm system with separate warnings and alarms for
Low oil level. Warning
Low low oil level. Alarm and shutdown
High oil temperature. Warning
High high oil temperature. Alarm and shutdown
High oil pressure. Warning
Low oil pressure. Alarm
El.motor fuse tripped. Alarm
All warnings and alarms will be reflected in a NC dry contact common alarm

Optional:
Remote control panel
Serial computer interface, several protocols available
Hardwired computer interface

Other accumulator sizes and pump sizes on request.
Hydraulic Power Pack Schematic

Explanations:
PT = Pressure Transmitter
PAH = Pressure Alarm High
PAL = Pressure Alarm Low
PI = Pressure Indicator
LG = Level Gauge
LAL = Level Alarm Low
LALL = Level Alarm Low Low, Shutdown
TAH = Temperature Alarm High
TAHH = Temperature Alarm High High, Shutdown
M = Electric Motor
P = Oil Pressure to System
T = Oil Return from System
Solenoid Valve Cabinet

Cabinet with door in front. Separated electro-hydraulic and electric sections.

- Wandfluh NG4 solenoid valve
- 24VDC coils
- Solenoid valves mounted on manifold blocks in the rear of the cabinet
- Cable entrance through top or side of cabinet
- Hydraulic connections to actuators through back of cabinet
- Isolation valve and quick connectors for hand pump for emergency operation of the system
- Filter unit in pressure line
Control Circuit D21

Direct indication Open/Close

Open/Close control, fall to set, Direct Indication.
Control via bistable directional valve, 4/2 type, activated by two solenoids operated by electric signals.
Open/Close indication by two micro switches mounted in stainless steel housing, protection grade IP68, mounted directly on the actuator.
Open/Close control, fall to set, Indirect Indication.
Control via bistable directional valve, 4/2 type, activated by two solenoids operated by electric signals.

Open/Close position indication by flow/pressure switches in both “A” and “B” lines.
The pressure switches are activated at a pressure of less than 10 bar, and due to the throttle valve in the T-line, return flow in “A” or “B” line is indicated even at low pressure.
Activated pressure switch in “A” line only indicates actuator in “CLOSE” position, and activated pressure switch in “B” line indicates “OPEN” position.
Both pressure switches activated indicates “ACTUATOR MOVING”.

This indication circuit gives a positive feedback on actuator movement by indicating flow in the return line from the actuator.
Throttle control, fail to set, Direct indication.

Control via spring loaded directional valve, 4/3 type, activated by two solenoids operated by electric signal. Upon release of electric signal to the solenoid, the directional valve returns to center position. A hydrolock keeps the actuators in its set position.

The built in relief valves prevents accumulation of high pressure in the actuator lines due to temperature changes.

Continuous indication by potentiometer mounted in stainless steel housing, protection grade IP68, mounted directly on the actuator.
Throttle control, fail to set, Indirect indication, Pressure and temperature independent.

Control via spring loaded directional valve, 6/3 type, activated by two solenoids operated by electric signals. Upon release of electric signal to the solenoid, the pressure in the lines from the actuators is drained to tank.

A hydrolock with built in relief valves is mounted on the actuator, and maintains the position of the valve when the control lines are drained. The relief valve prevents accumulation of high pressure in the actuator lines due to temperature changes.

Continuous indication of the valve position is achieved by a potentiometer connected to a piston type volumetric indicator mounted in the solenoid valve cabinet. The volumetric indicator has a visual indicator in front for local indication of the valve position.

The volumetric indicator is connected to the return line from actuator, and not exposed to variations in pressure. When the circuit is not activated, the indicator is isolated from the lines, and not influenced by volume variations due to pressure changes. If the volumetric indicator for some reason is not synchronised with the actuator, the indicator will automatically be synchronised with the actuator each time the valve is operated from one end position to the other.
**Open/Close control, fall to Close (or open). Direct Indication.**

Control via spring loaded directional valve, 4/2 type, activated by one solenoid operated by electric signal.

Open/Close indication by two limit switches mounted in stainless steel housing, protection grade IP68, mounted directly on the actuator.
Indirect indication Open/Close

Open/Close control, fail to Close (or open), Indirect Indication.
Control via spring loaded directional valve, 4/2 type, activated by one solenoid operated by electric signal.

Open/Close position indication by pressure switches in the actuator lines. The pressure switch is activated by pressure less than 10 bar.

Pressure in the actuator line indicates actuator in “OPEN” position (fail to close actuators) or “ACTUATOR MOVING”.

Pressure in the actuator line indicates actuator in SAFE position (closed for fail to close actuators).

The pressure switch is equipped with a 3-pt. switchover contact.
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Service Department

Scana Skarpenord AS is continuously keeping a “service stock” in order to deliver spare parts quickly. A staff of well qualified service engineers, also with safety course required for offshore, will at short notice perform necessary maintenance and service, onshore/offshore – world wide.

During installation and start-up, our service engineers can also be required for assistance and supervision. Detailed information for installation, start-up and maintenance will be given in service manuals.

Quality Assurance

Scana Skarpenord’s products, services and production are assured through an extensive Quality Assurance System (QA-system). The QA-system is approved by Det norske Veritas (DNV) to comply with ISO 9001: 2008.

Type Approval

The actuators, both the Scotch Yoke and the Linear type are type-approved by DNV.

Classification Society Approvals

The Valve Remote Control systems have been approved by among others:
• Det norske Veritas
• Bureau Veritas
• Lloyd’s Register of Shipping
• Chinese Classification Society
• American Bureau of Shipping
• Germanischer Lloyd