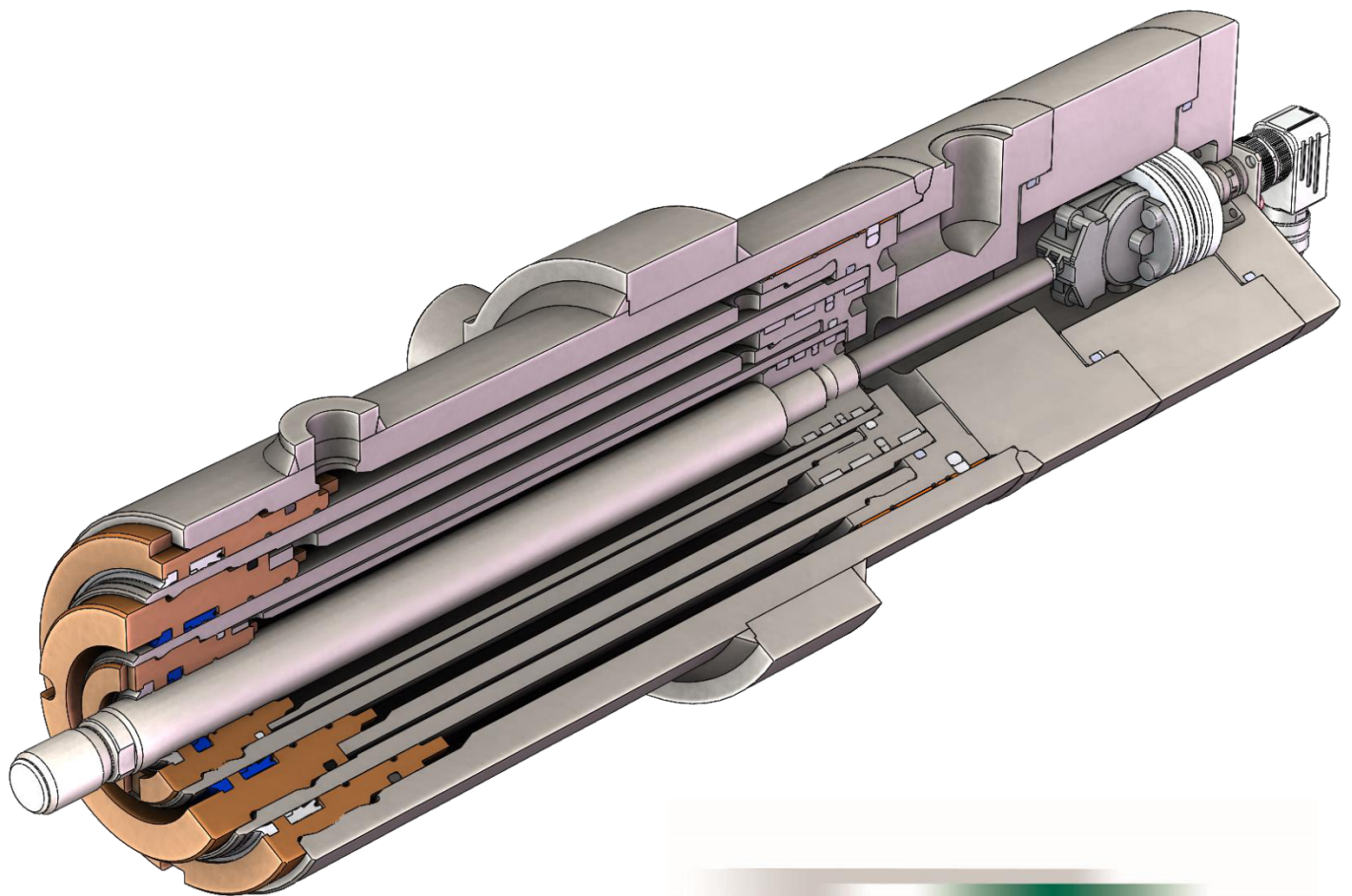


## **ZTW 212**

# **Double-Acting Telescopic Cylinder with Position Measuring System**

*Brochure 01.20/DS27410*



## Description:

The STORZ hydraulic cylinder series ZTW 212 for 120 bar nominal pressure is the further development of the double-acting telescopic cylinder series ZT 212. The proven telescopic cylinder series is supplemented by a position measuring system. An internally installed, pressure-resistant cable-pull sensor enables position sensing of the piston rod of the telescopic cylinder. The cable-pull sensor is attached to the smallest piston rod of the telescopic cylinder attached. This ensures reliable, absolute position measurement of the stroke, regardless of which stage is currently moving. Several standards as well as redundant measurement are available as output signal. The position measuring system is completely encapsulated, installed inside the cylinder and sealed to the outside. As connection interface, a plug connection is available.

The ZTW 212 series can be supplied as standard with a stroke of up to 5000 mm (longer stroke on request).

The ZTW 212 series is consistently based on the ZT 212 series. The position measuring system is integrated in the cylinder cap installed, so only this component of the cylinder differs from the series without position measuring system.

5 mounting types and 2 seal variants are available as standard.

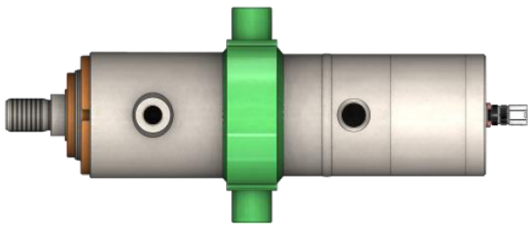
Mounting parts available separately.

## Technical data:

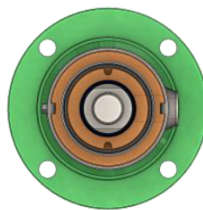
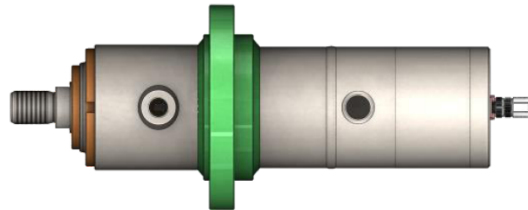
|                       |                                                 |
|-----------------------|-------------------------------------------------|
| Nominal pressure:     | 120 bar (12 MPa)                                |
| Static test pressure: | 180 bar (18 MPa)                                |
| Piston ø:             | 63 – 140 mm (others possible on request)        |
| Temperature range:    | -20 °C ... +80 °C (by hydraulic fluid)          |
| Viscosity range:      | (10 ... 600) 10 <sup>-6</sup> m <sup>2</sup> /s |
| Stroke speed range:   | 0 – 0.5 m/s                                     |
| Hydraulic fluid:      | Mineral oil according to DIN 51524, HFD fluids  |



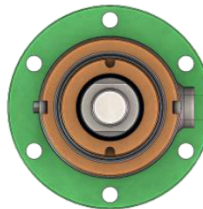
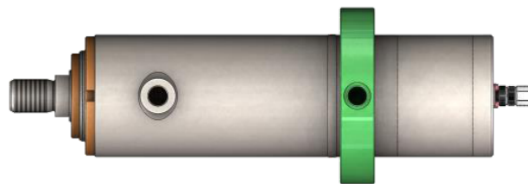
**Mounting types:**



**B** Trunnion (p.4)



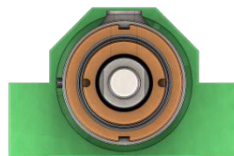
**CA** Round flange at cylinder head (p.6)



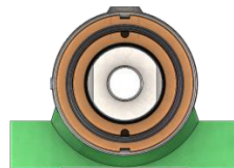
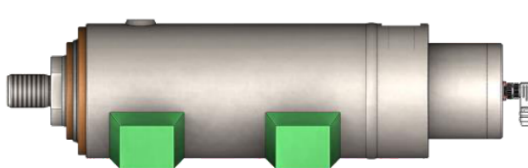
**CB** Round flange at cap (p.7)



**DB** Spherical eye at cap (p.8)

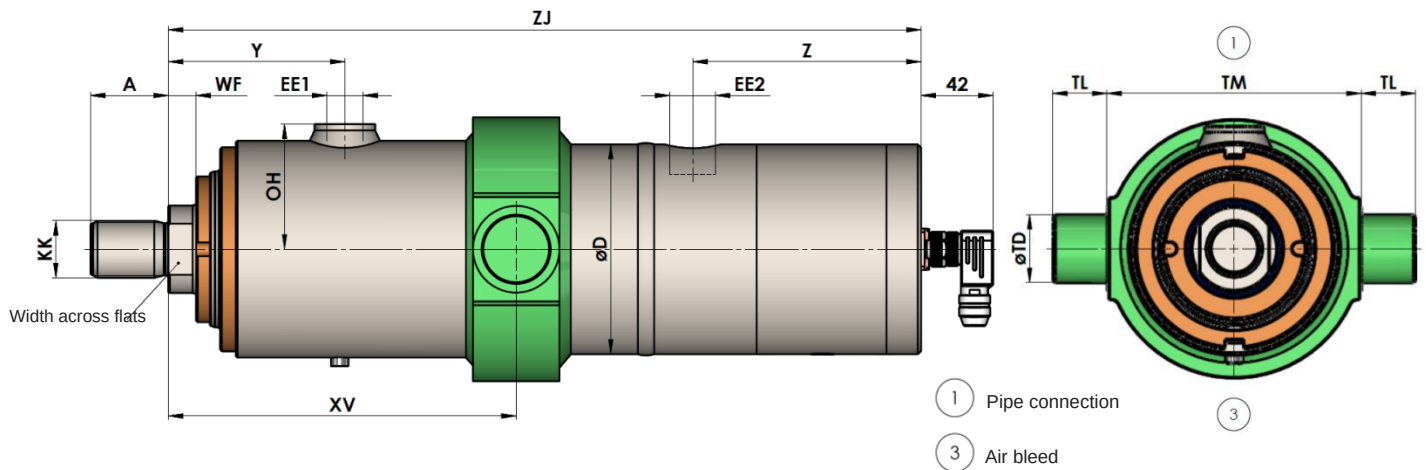


**EA-1** Foot mounting (p.9)



**EA-2** Foot mounting (p.10)

further mounting types on request

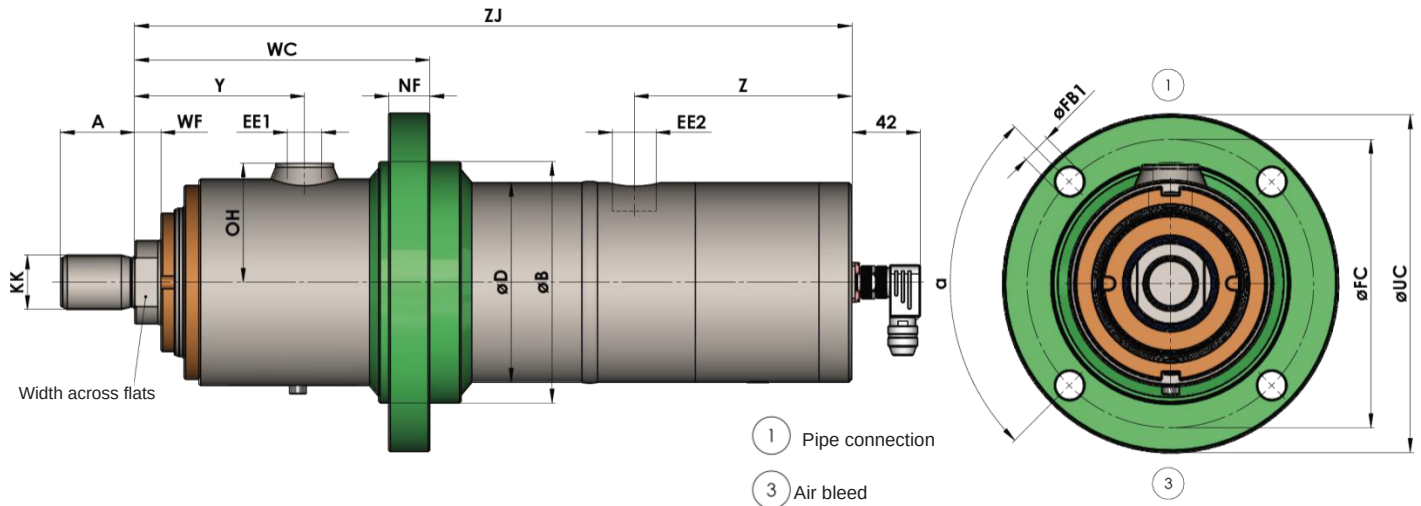
**Mounting type B – cylinder with trunnion**


| smallest stage ø MM | ZJ             | Rod thread | KK | A max. | Y  | OH   | EE1 | Z    | EE2 | WF  | ø D | ø TD f8 | TM h13 | TL js16 | XV min. <sup>1)</sup> | XV max. <sup>1)</sup> | Width across flats |
|---------------------|----------------|------------|----|--------|----|------|-----|------|-----|-----|-----|---------|--------|---------|-----------------------|-----------------------|--------------------|
| <b>2-stage</b>      |                |            |    |        |    |      |     |      |     |     |     |         |        |         |                       |                       |                    |
| <b>52</b>           | Stroke/2 + 335 | M33x2      | 45 | 102    | 72 | G1/2 | 132 | G3/4 | 16  | 121 | 40  | 150     | 32     | 172     | Stroke/2 + 135        | 41                    |                    |
| <b>90</b>           | Stroke/2 + 379 | M42x2      | 56 | 115    | 90 | G1/2 | 130 | G1   | 20  | 170 | 63  | 205     | 50     | 202     | Stroke/2 + 156        | 75                    |                    |
| <b>3-stage</b>      |                |            |    |        |    |      |     |      |     |     |     |         |        |         |                       |                       |                    |
| <b>22</b>           | Stroke/3 + 322 | M20x1,5    | 28 | 100    | 72 | G1/2 | 132 | G3/4 | 13  | 121 | 40  | 150     | 32     | 169     | Stroke/3 + 122        | 19                    |                    |
| <b>52</b>           | Stroke/3 + 369 | M33x2      | 45 | 113    | 90 | G1/2 | 130 | G1   | 16  | 178 | 63  | 205     | 50     | 198     | Stroke/3 + 147        | 41                    |                    |

<sup>1)</sup> State XV dimension in plain text when ordering

|                                                       |         |         |          |           |
|-------------------------------------------------------|---------|---------|----------|-----------|
| <b>Piston/rod ø [mm]</b>                              | 32 / 22 | 63 / 52 | 100 / 90 | 140 / 130 |
| <b>Piston area A<sub>1</sub> [cm<sup>2</sup>]</b>     | 8,04    | 31,17   | 78,54    | 153,94    |
| <b>Rod area A<sub>S</sub> [cm<sup>2</sup>]</b>        | 3,80    | 21,24   | 63,62    | 132,73    |
| <b>Retraction area A<sub>R</sub> [cm<sup>2</sup>]</b> | 4,24    | 9,93    | 14,92    | 100,00    |

Info: Other numbers of stages and piston rod diameters can be quickly realized on request.

**Mounting type CA – round flange at cylinder head**


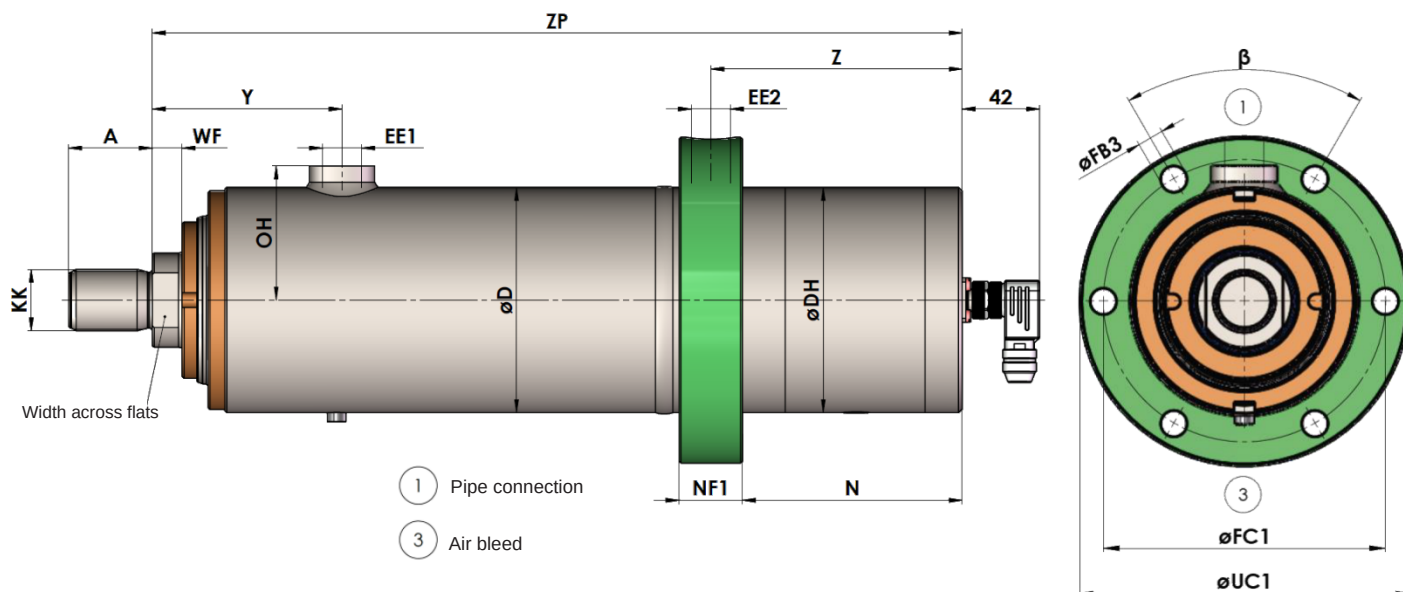
| smallest stage ø MM | ZJ             | Rod thread | KK | A max. | Y   | OH | EE1  | Z   | EE2  | WF | Ø D | Ø FB1 | Ø FC js13 | Ø B f8 | α       | WC  | NF | Ø UC | Width across flats |
|---------------------|----------------|------------|----|--------|-----|----|------|-----|------|----|-----|-------|-----------|--------|---------|-----|----|------|--------------------|
| <b>2-stage</b>      |                |            |    |        |     |    |      |     |      |    |     |       |           |        |         |     |    |      |                    |
| <b>52</b>           | Stroke/2 + 335 | M33x2      |    | 45     | 102 | 72 | G1/2 | 132 | G3/4 | 16 | 121 | 18    | 175       | 146    | 4 x 90° | 178 | 25 | 205  | 41                 |
| <b>90</b>           | Stroke/2 + 379 | M42x2      |    | 56     | 115 | 90 | G1/2 | 130 | G1   | 20 | 170 | 18    | 225       | 190    | 8 x 45° | 208 | 32 | 255  | 75                 |
| <b>3-stage</b>      |                |            |    |        |     |    |      |     |      |    |     |       |           |        |         |     |    |      |                    |
| <b>22</b>           | Stroke/3 + 322 | M20x1,5    |    | 28     | 100 | 72 | G1/2 | 132 | G3/4 | 13 | 121 | 18    | 175       | 146    | 4 x 90° | 175 | 25 | 205  | 19                 |
| <b>52</b>           | Stroke/3 + 369 | M33x2      |    | 45     | 111 | 90 | G1/2 | 130 | G1   | 16 | 178 | 18    | 225       | 190    | 8 x 45° | 204 | 32 | 255  | 41                 |

|                                            |         |         |          |           |
|--------------------------------------------|---------|---------|----------|-----------|
| <b>Piston/rod ø [mm]</b>                   | 32 / 22 | 63 / 52 | 100 / 90 | 140 / 130 |
| <b>Piston area A<sub>1</sub> [cm²]</b>     | 8,04    | 31,17   | 78,54    | 153,94    |
| <b>Rod area A<sub>s</sub> [cm²]</b>        | 3,80    | 21,24   | 63,62    | 132,73    |
| <b>Retraction area A<sub>R</sub> [cm²]</b> | 4,24    | 9,93    | 14,92    | 100,00    |

Info: Other numbers of stages and piston rod diameters can be quickly realized on request.

# Double-Acting Telescopic Cylinder with Position Measuring System ZTW 212

## Mounting type CB – round flange at cylinder cap



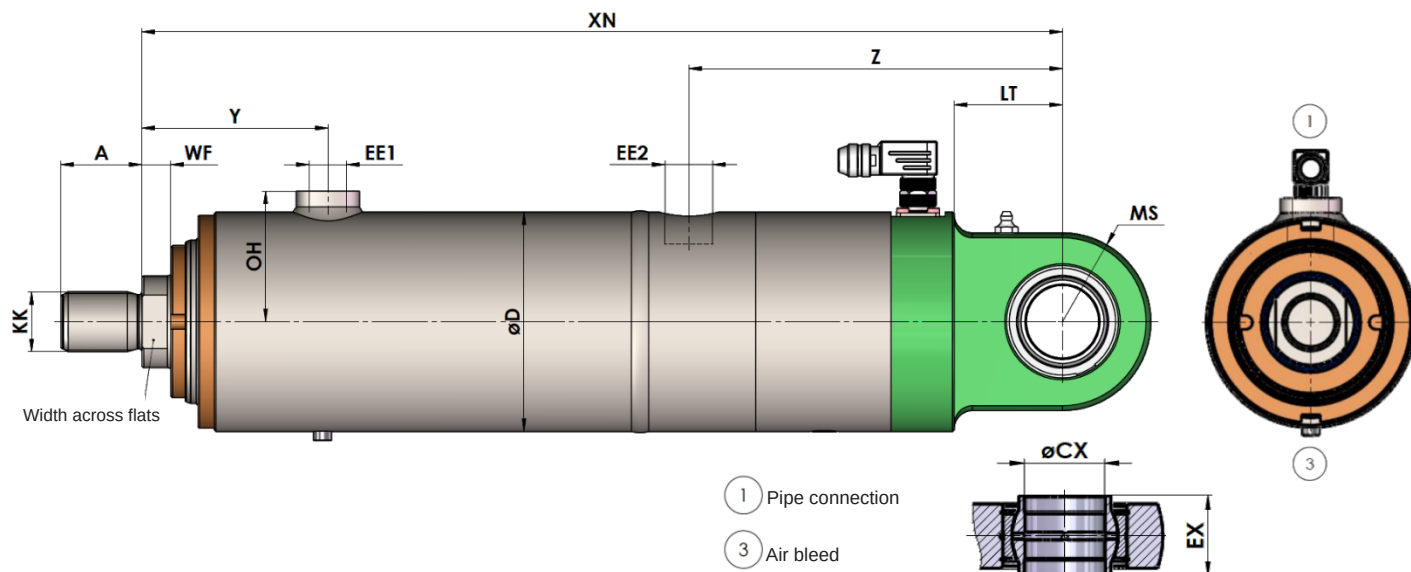
| smallest stage ø MM | ZP             | Rod thread | KK | A max. | Y  | OH   | EE1 | Z    | EE2 | WF  | ø DH | ø D | ø FB3 | ø FC1 js13 | β  | NF1 | ø UC1 | Width across flats |
|---------------------|----------------|------------|----|--------|----|------|-----|------|-----|-----|------|-----|-------|------------|----|-----|-------|--------------------|
| 2-stage             |                |            |    |        |    |      |     |      |     |     |      |     |       |            |    |     |       |                    |
| 52                  | Stroke/2 + 335 | M33x2      | 45 | 102    | 72 | G1/2 | 135 | G1/2 | 16  | 121 | 121  | 14  | 150   | 6 x 60°    | 34 | 175 | 41    |                    |
| 90                  | Stroke/2 + 379 | M42x2      | 56 | 115    | 90 | G1/2 | 130 | G3/4 | 20  | 121 | 170  | 18  | 210   | 6 x 60°    | 40 | 238 | 75    |                    |
| 3-stage             |                |            |    |        |    |      |     |      |     |     |      |     |       |            |    |     |       |                    |
| 22                  | Stroke/3 + 322 | M20x1,5    | 28 | 100    | 72 | G1/2 | 135 | G1/2 | 13  | 121 | 121  | 14  | 150   | 6 x 60°    | 34 | 175 | 19    |                    |
| 52                  | Stroke/3 + 369 | M33x2      | 45 | 111    | 90 | G1/2 | 130 | G3/4 | 16  | 121 | 170  | 18  | 210   | 6 x 60°    | 40 | 238 | 41    |                    |

|                                                       |         |         |          |           |
|-------------------------------------------------------|---------|---------|----------|-----------|
| <b>Piston/rod ø [mm]</b>                              | 32 / 22 | 63 / 52 | 100 / 90 | 140 / 130 |
| <b>Piston area A<sub>1</sub> [cm<sup>2</sup>]</b>     | 8,04    | 31,17   | 78,54    | 153,94    |
| <b>Rod area A<sub>s</sub> [cm<sup>2</sup>]</b>        | 3,80    | 21,24   | 63,62    | 132,73    |
| <b>Retraction area A<sub>R</sub> [cm<sup>2</sup>]</b> | 4,24    | 9,93    | 14,92    | 100,00    |

Info: Other numbers of stages and piston rod diameters can be quickly realized on request.

# Double-Acting Telescopic Cylinder with Position Measuring System ZTW 212

## Mounting type DB – swivel eye at cylinder cap



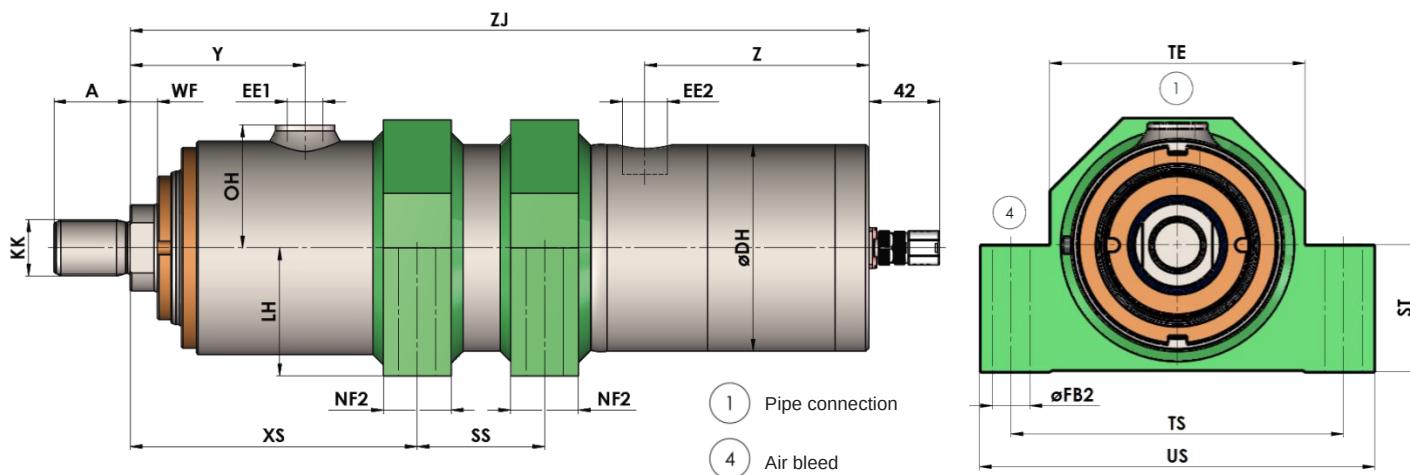
| smallest stage ø MM | XN             | Rod thread | KK | A max. | Y   | OH | EE1  | Z   | EE2  | WF | øD  | LT | MS max. | øCXH7 | EX h12 | Width across flats |
|---------------------|----------------|------------|----|--------|-----|----|------|-----|------|----|-----|----|---------|-------|--------|--------------------|
| <b>2-stage</b>      |                |            |    |        |     |    |      |     |      |    |     |    |         |       |        |                    |
| <b>52</b>           | Stroke/2 + 410 | M33x2      |    | 45     | 102 | 72 | G1/2 | 207 | G3/4 | 16 | 121 | 60 | 49      | 40    | 40     | 41                 |
| <b>90</b>           | Stroke/2 + 450 | M42x2      |    | 56     | 115 | 90 | G1/2 | 201 | G1   | 20 | 170 | 75 | 59      | 50    | 50     | 75                 |
| <b>3-stage</b>      |                |            |    |        |     |    |      |     |      |    |     |    |         |       |        |                    |
| <b>22</b>           | Stroke/3 + 397 | M20x1,5    |    | 28     | 100 | 72 | G1/2 | 207 | G3/4 | 13 | 121 | 60 | 49      | 40    | 40     | 18                 |
| <b>52</b>           | Stroke/3 + 440 | M33x2      |    | 45     | 111 | 90 | G1/2 | 201 | G1   | 16 | 170 | 75 | 59      | 50    | 50     | 41                 |

|                                                       |         |         |          |           |
|-------------------------------------------------------|---------|---------|----------|-----------|
| <b>Piston/rod ø [mm]</b>                              | 32 / 22 | 63 / 52 | 100 / 90 | 140 / 130 |
| <b>Piston area A<sub>1</sub> [cm<sup>2</sup>]</b>     | 8,04    | 31,17   | 78,54    | 153,94    |
| <b>Rod area A<sub>S</sub> [cm<sup>2</sup>]</b>        | 3,80    | 21,24   | 63,62    | 132,73    |
| <b>Retraction area A<sub>R</sub> [cm<sup>2</sup>]</b> | 4,24    | 9,93    | 14,92    | 100,00    |

Info: Other numbers of stages and piston rod diameters can be quickly realized on request.

# Double-Acting Telescopic Cylinder with Position Measuring System ZTW 212

## Mounting type EA-1 – foot mounting up to piston ø100



| smallest stage ø MM | ZJ             | Rod thread | KK | A max. | Y  | OH   | EE1 | Z    | EE2 | WF  | øDH | LH h14 | XS | NF2 |
|---------------------|----------------|------------|----|--------|----|------|-----|------|-----|-----|-----|--------|----|-----|
| <b>2-stage</b>      |                |            |    |        |    |      |     |      |     |     |     |        |    |     |
| 52                  | Stroke/2 + 410 | M33x2      | 45 | 102    | 72 | G1/2 | 207 | G3/4 | 16  | 121 | 75  | 169    | 40 |     |
| <b>3-stage</b>      |                |            |    |        |    |      |     |      |     |     |     |        |    |     |
| 22                  | Stroke/3 + 397 | M20x1,5    | 28 | 100    | 72 | G1/2 | 207 | G3/4 | 13  | 121 | 75  | 169    | 40 |     |

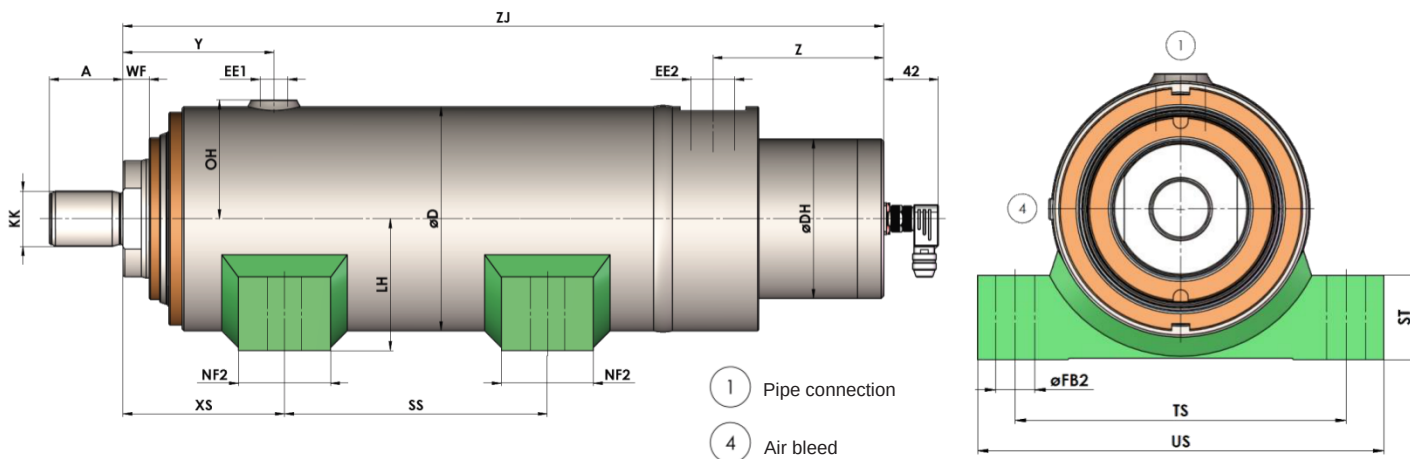
|                | SS min. | SS max.       | øFB2 | TS js13 | US  | ST | TE  | Minimum stroke | Width across flats |
|----------------|---------|---------------|------|---------|-----|----|-----|----------------|--------------------|
| <b>2-stage</b> |         |               |      |         |     |    |     |                |                    |
| 52             | 100     | Stroke/2 - 25 | 22   | 195     | 232 | 75 | 150 | 250            | 41                 |
| <b>3-stage</b> |         |               |      |         |     |    |     |                |                    |
| 22             | 100     | Stroke/3 - 38 | 22   | 195     | 232 | 75 | 150 | 415            | 18                 |

|                                                   |         |         |          |           |
|---------------------------------------------------|---------|---------|----------|-----------|
| Piston/rod ø [mm]                                 | 32 / 22 | 63 / 52 | 100 / 90 | 140 / 130 |
| Piston area A <sub>1</sub> [cm <sup>2</sup> ]     | 8,04    | 31,17   | 78,54    | 153,94    |
| Rod area A <sub>s</sub> [cm <sup>2</sup> ]        | 3,80    | 21,24   | 63,62    | 132,73    |
| Retraction area A <sub>R</sub> [cm <sup>2</sup> ] | 4,24    | 9,93    | 14,92    | 100,00    |

Info: Other numbers of stages and piston rod diameters can be quickly realized on request.

# Double-Acting Telescopic Cylinder with Position Measuring System ZTW 212

## Mounting type EA-2 – foot mounting from piston ø100



| smallest stage ø MM | ZJ             | Rod thread | KK | A max. | Y  | OH   | EE1 | Z  | EE2 | WF  | øD  | øDH | LH h14 | XS | NF2 |
|---------------------|----------------|------------|----|--------|----|------|-----|----|-----|-----|-----|-----|--------|----|-----|
| <b>2-stage</b>      |                |            |    |        |    |      |     |    |     |     |     |     |        |    |     |
| 90                  | Stroke/2 + 410 | M42x2      | 56 | 115    | 90 | G1/2 | 130 | G1 | 20  | 170 | 121 | 100 | 123    | 70 |     |
| <b>3-stage</b>      |                |            |    |        |    |      |     |    |     |     |     |     |        |    |     |
| 52                  | Stroke/3 + 397 | M33x2      | 45 | 111    | 90 | G1/2 | 130 | G1 | 16  | 170 | 121 | 100 | 119    | 70 |     |

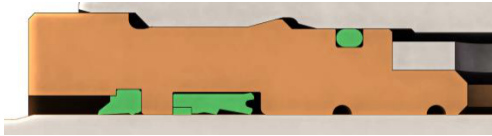
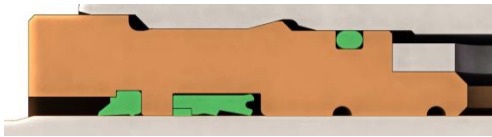
|                | SS min. | SS max.       | øFB2 | TS js13 | US  | ST | Minimum stroke | Width across flats |
|----------------|---------|---------------|------|---------|-----|----|----------------|--------------------|
| <b>2-stage</b> |         |               |      |         |     |    |                |                    |
| 90             | 130     | Stroke/2 + 30 | 26   | 220     | 270 | 56 | 200            | 41                 |
| <b>3-stage</b> |         |               |      |         |     |    |                |                    |
| 52             | 130     | Stroke/3 + 24 | 26   | 220     | 270 | 56 | 318            | 18                 |

|                                      |         |         |          |           |
|--------------------------------------|---------|---------|----------|-----------|
| Piston/rod ø [mm]                    | 32 / 22 | 63 / 52 | 100 / 90 | 140 / 130 |
| Piston area A <sub>1</sub> [cm²]     | 8,04    | 31,17   | 78,54    | 153,94    |
| Rod area A <sub>S</sub> [cm²]        | 3,80    | 21,24   | 63,62    | 132,73    |
| Retraction area A <sub>R</sub> [cm²] | 4,24    | 9,93    | 14,92    | 100,00    |

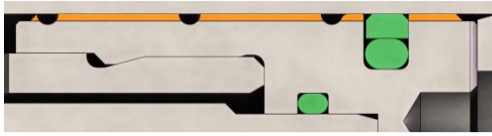
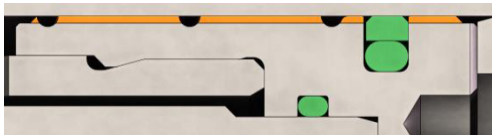
Info: Other numbers of stages and piston rod diameters can be quickly realized on request.

## Seal variants – schematic representation

### Rod seal

| Code letter                 | Schematic representation                                                          | Features                                                                                                                                                                  |
|-----------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>K</b> (standard version) |  | <p>U-cup seal made of Perbunan<br/> Temperature range: -30 °C to +80 °C<br/> Hydraulic fluid: mineral oil</p> <p>Universal industrial use</p> <p>High wear resistance</p> |
| <b>KV</b> (Viton)           |  | <p>U-cup seal made of Viton<br/> Temperature range: -20 °C to +130 °C</p>                                                                                                 |

### Piston seal

| Code letter                 | Schematic representation                                                            | Features                                                                                                                                                                                                                                                                                      |
|-----------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>G</b> (standard version) |  | <p>Teflon seal<br/> Temperature range: -10 °C to +80 °C<br/> Hydraulic fluid: mineral oil</p> <p>Stick-slip-free stroke motion, low wear, insensitive to aerated systems</p> <p>As GV version, with Viton O-ring, for high temperatures (up to +200 °C) and for fire-resistant HFD fluids</p> |
| <b>GV</b> (Viton)           |  | <p>Viton O-ring, for high temperatures (up to +200 °C) and for fire-resistant HFD fluids</p>                                                                                                                                                                                                  |

*Other seal versions possible on request.*

## Double-Acting Telescopic Cylinder with Position Measuring System ZTW 212

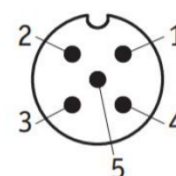
### Position measuring system – Technical data

| Interface analog        |                                      |                                                    |
|-------------------------|--------------------------------------|----------------------------------------------------|
| Feature                 | Technical data                       | Supplement                                         |
| Operating voltage       | 12 ... 32 V DC                       | with output 0 ... 10 V, reverse polarity protected |
|                         | 12 ... 32 V DC                       | with output 4 ... 20 mA                            |
| Current consumption     | <32 mA                               | without load                                       |
| Power consumption       | <0,5 W                               | without load                                       |
| Digital inputs          |                                      | 2 Limit inputs                                     |
| Input signal level high | > 8,4 V                              |                                                    |
| Input signal level low  | < 2,8 V                              |                                                    |
| Output voltage          | 0 ... 10 V                           | Load current < 10 mA                               |
| Output current          | 4 ... 20 mA                          | Load ≤ 500 Ω                                       |
| Settling time           | < 150 ms                             |                                                    |
| Connection type         | Plug connection                      |                                                    |
| Interface CANopen       |                                      |                                                    |
| Feature                 | Technical data                       | Supplement                                         |
| Operating voltage       | 10 ... 30 V DC                       | reverse polarity protected                         |
| Power consumption       | < 0,8 W                              |                                                    |
| Interface               | according to ISO 11898, not isolated | CANopen, CIA 406; CIA 301                          |
| Address                 | adjustable                           | via SDO or Layer Setting Service (LSS)             |
| Baud rate               | ≤ 1 MBit/s                           |                                                    |
| Cycle time              | < 1,5 ms                             |                                                    |
| Settling time           | < 150 ms                             |                                                    |
| Connection type         | Plug connection                      |                                                    |

### Position measuring system – Pin assignment

| Signal analog     | Signal CANopen | PIN |
|-------------------|----------------|-----|
| $I_{OUT}/U_{OUT}$ | CAN_GND        | 1   |
| +UB               | +UB            | 2   |
| GND               | GND            | 3   |
| Limit 1           | CAN_H          | 4   |
| Limit 2           | CAN_L          | 5   |

View of pin contact



## Double-Acting Telescopic Cylinder with Position Measuring System ZTW 212

### Model code:

ZTW 212 - B - 100/90 - 63/52 - 32/22 - 900 - K G - 2 - 1

### Double-acting telescopic cylinders with Position Measuring System

Nominal pressure 120 bar (12 MPa)

### Mounting type

- B** Trunnion (state dimension XV when ordering)
- CA** Round flange, head end
- CB** Round flange, cap end
- DB** Swivel eye at cylinder cap
- EA** Spherical eye at cylinder cap

### Stages (piston/rod ø)

### Cylinder stroke in mm

### Rod seal

- K** U-cup seal (material Perbunan NBR)
- KV** U-cup seal (material Viton)

### Piston seal

- G** Teflon seal (material PTFE + NBR O-ring)
- GV** Teflon seal (material PTFE + Viton O-ring)

### Position sensor code

| Signal      | 0-999 | 999-2499 | 2500-5000 mm stroke |
|-------------|-------|----------|---------------------|
| 0 ... 10 V  | 1     | 4        | 7                   |
| 4 ... 20 mA | 2     | 5        | 8                   |
| CANopen     | 3     | 6        | 9                   |

### Version code

(specified by the manufacturer)

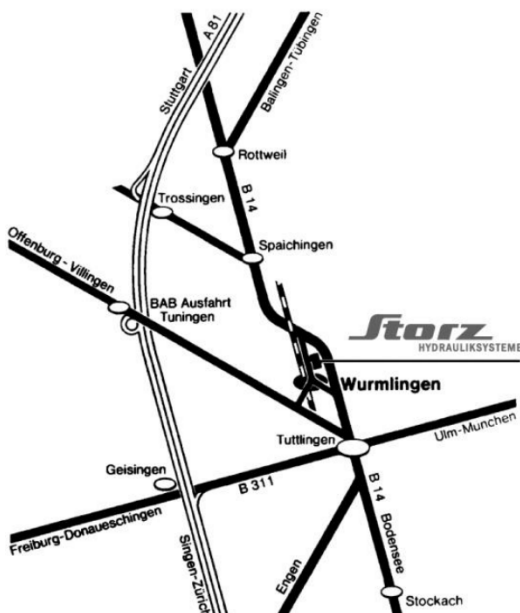
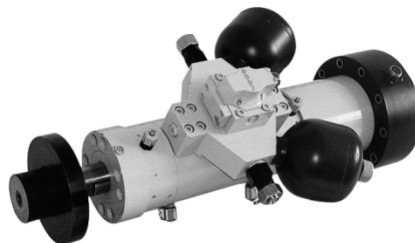
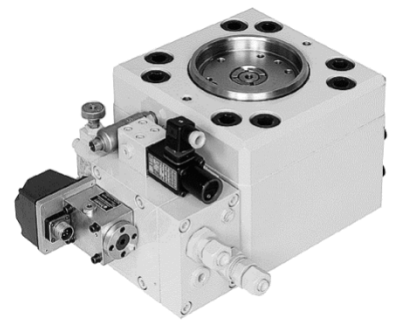
Example: Double-acting telescopic cylinder with position measuring system 120 bar nominal pressure with the following data:

Mounting type: trunnion; 3 stages; largest stage 100/90, stroke 900 mm;  
Rod seal U-cup NBR; Piston seal Teflon ring + NBR O-ring;  
analog PMS with 4-20 mA

**ZTW 212-B-100/90-63/52-32/22-900-KG-2**



Hydraulic cylinders to DIN/ISO  
Hydraulic standard cylinders  
Hydraulic telescopic cylinders  
Hydraulic cylinders with position measuring systems  
Hydraulic coiler cylinders  
Test-machine cylinders  
Special cylinders for all fields of application  
Standardized mounting parts  
Hydraulic power units and components  
Plant engineering



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