

# Measurement and Sensor Systems



Joystick



Hydraulically operated control equipment, e. g. on

- Construction and drilling vehicles
- Cranes and excavators
- Lifting devices and conveying equipment
- Ships and offshore facilities, etc.

are to an increasing extent controlled by electronic means nowa-days. This is the application range – in consideration of the extreme conditions of use – which the control transmitters ST2000 are especially designed for. Corresponding to the lever displacement, they provide a direction dependent switch and control signal output for both axes x and y.

Other control commands can be initiated by actuating the control elements integrated in the grip handle of the control stick.

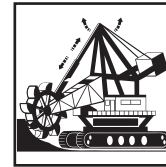
**Wear-free and non-contacting inductive or magnetic systems are used as primary elements of the measuring system. An additional cost-effective option with resistance output is also available. They are available as uniaxial and dual axis transmitters.**

The integrated electronic circuit provides for control purposes on its output per axis either a current or a voltage signal (analogue) and with CANopen interface (digital) respectively also redundant for security relevant applications according to IEC 61508 SIL (Safety Integrated Level) and ISO 13849 PL (Performance Level) respectively.

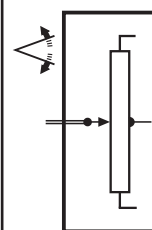
Transmission protocol according to user requirements.

For direct drive of hydraulic servo valves the inductive control system can also be equipped with an integrated power electronics with pulse-width-modulated output current up to 1000 mA.

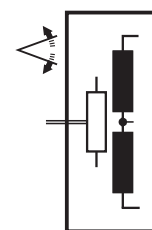
## Application range



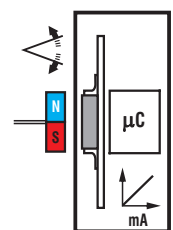
## Measuring systems



Potentiometric

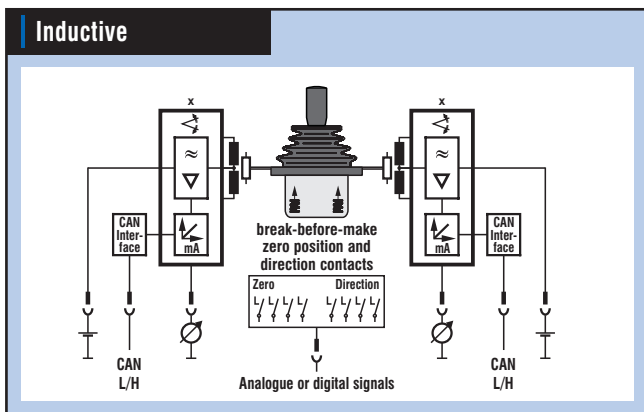


Inductive

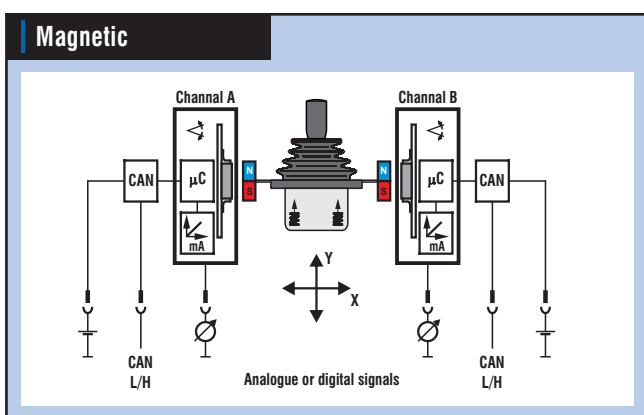


Magnetic

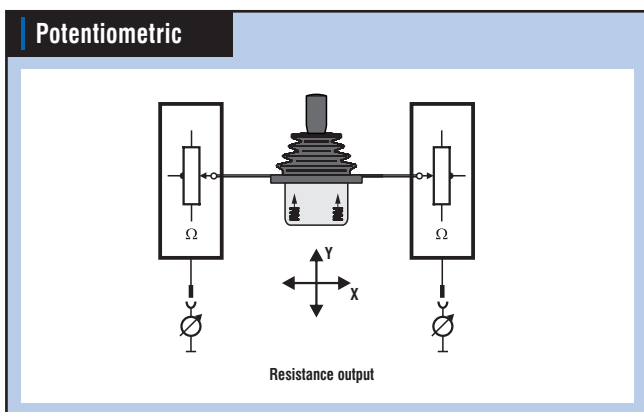
# System versions



- uniaxial and dual axis transmitter
- lever displacement  $\pm 20^\circ$
- non-contacting control system
- output: analogue or digital
- zero position and direction signals via break-before-make contacts (also electronically)

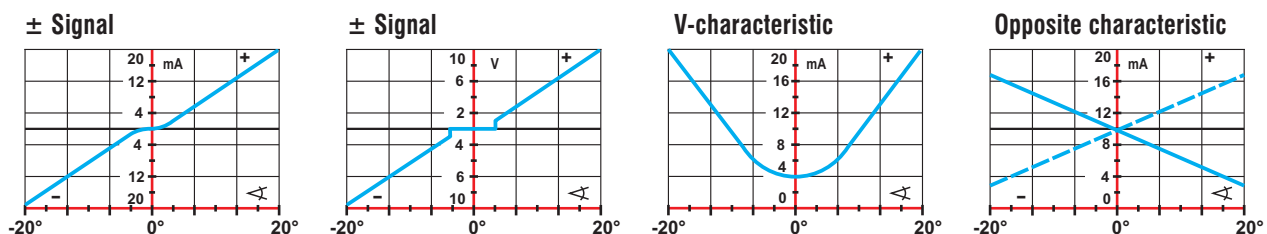


- uniaxial and dual axis transmitter
- lever displacement  $\pm 30^\circ$
- non-contacting control system with completely encapsulated electronic circuit
- output: analogue or digital
- direction signal electronic



- uniaxial and dual axis transmitter
- lever displacement  $\pm 20^\circ$ ;  $\pm 30^\circ$
- switching: 0 - up to  $\pm$  or V-characteristic
- resistance output with 2 or 5 k $\Omega$
- without zero position and direction signal

## Course of analogue control signals – Examples



# Specifications

Models						
						
Series	ST-MH/GS 45	ST-MH/GS 52 ST-PK/GS 52	ST-MH/GS 60 ST-PK/GS 60	ST-W/GS 78	ST-MH/GS 80	ST-W/GS 82
Article main number	3585Z01...	3550Z50...	3550Z01...	3495Z...	3497Z...	3498Z...
Uniaxial system x or y	-	✓	-	-	-	-
With lever link x or y	-	-	✓	✓	✓	✓
Dual axis system x and y	✓	-	✓	✓	✓	✓
Triple axis system	✓	-	-	-	-	-
Lever displacement	± 20°	± 20°	± 30°	± 20°	± 20°	± 20°
Lever-return to central position by spring	✓	✓	✓	✓	✓	✓
Lever-return with locking disk and brake	-	-	✓	-	✓	-
System version potentiometric	-	✓	✓	-	-	-
magnetic	✓	✓	✓	-	✓	-
inductive	-	-	-	✓	-	✓
Signal output analogue	✓	✓	✓	✓	✓	-
digital	✓	-	✓	-	✓	✓
Zero position and direction signals electronic	✓	✓	✓	-	✓	✓
switch	-	-	-	✓	-	-
Mechanical data						
Casing material alu anodised	-	-	-	✓	✓	✓
Plastic molded recess, Noryl	✓	✓	✓	✓	✓	✓
Bellows, Simrit 42CR 784	✓	✓	✓	✓	✓	✓
IP code of casing	IP 65*	IP 68*	IP 65*	IP 65*	IP 65*	IP 65*
Electrical connection cable or plug	✓	✓	✓	✓	✓	✓
Weight	0,2 kg	0,15 kg	0,2 kg	2 kg	2 kg	2 kg

\* up to IP 67 available (special version)



On request also available in version according to IEC 61508, SIL (Safety Integrated Level) or ISO 13849, PL (Performance Level) possible



Electrical data	
Analogue output current signal	4 - 12 - 20 mA, ± 20 mA, $R_L \leq 600\Omega$
Voltage signal	0 - 10 V, ± 10 V, $R_L \geq 10\text{ k}\Omega$
Resistance output	2 or 5 k $\Omega$ ± 20 %, Lin ± 1 %, with center tapping each
Digital output	CANopen safety, redundant according to IEC 61508 SIL2
Zero position and direction signal	electronically: PNP max 24 V, 30 mA, short-circuit proof mechanically: break-before-make contacts, max 30 V, max 3 A
Supply	18 - 33 VDC, redundant 2 x 18 - 33 VD

General data	
Temperature range	- 30° C bis +70° C
Test voltage	500 V, 50 Hz, 1 min
Transient emissions	EN 61 000-6-4
Interference resistance	EN 61 000-6-2
Shock	50 g , 6 ms
Vibration	5 - 200 Hz, 10 g

# Specification of control handle

Handle assembly	
Assembly variants	with pushbutton, non-locking rocker actuated switch, adjusting wheel
Electrical connection	dead man's button and vibrator via led-through stranded wires (length according to requirement)

Data of adjust wheel	
Operating voltage	5 V, 12 V or 24 V
Output signal	0,5 V up to 4,5 V
Angel of adjusting wheel	$\pm 30^\circ$
Versions	elastic (center position) or non-elastic
Temperature range	- 30° C up to +70° C
IP code	IP 65

Switch data	
IP code	IP 67
Voltage	max 30 VDC
Current	max 250 mA, contact material silver
Mechanical actuating cycles	max. 10 <sup>6</sup>
Temperature range	- 30° C up to +70° C

Vibrator data	
Voltage	24 VDC, coil resistance 160Ω
Frequency	max 25 Hz
Duty cycle	100 %

Further assemblies and handle designs on request.

### Multifunctional control handle ST 2000

Basic measurements of switch units

### Multifunctional control handle ST 2010

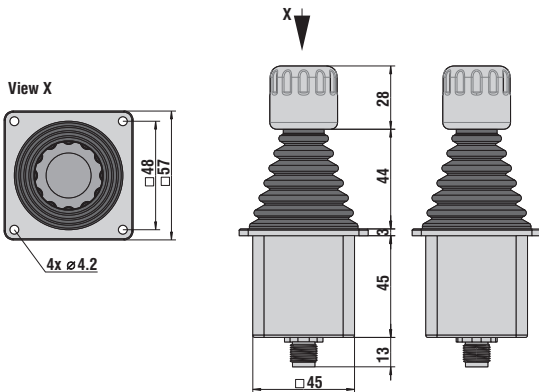
View X

### Capacitive effect

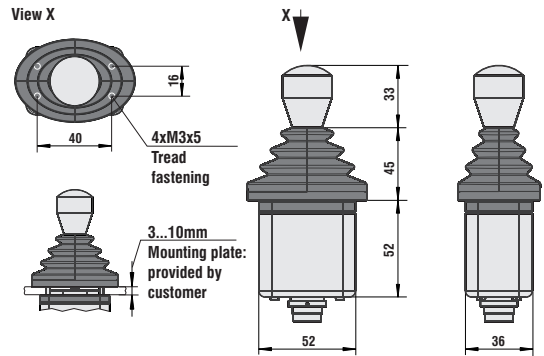
View X

# Models

## ST-MH/GS 45

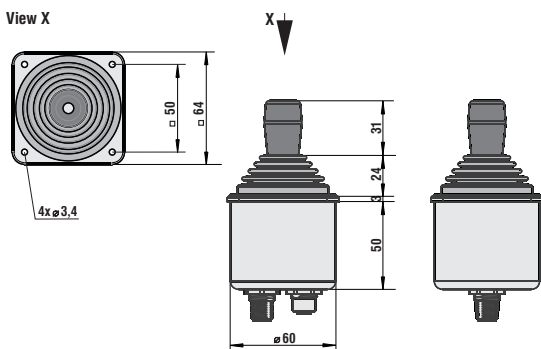


## ST-... /GS 52



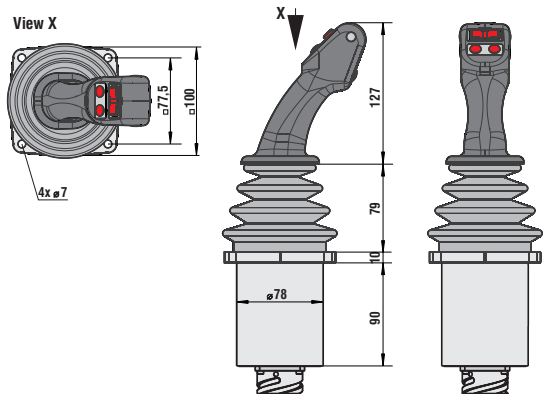
ST-MH/GS 52  
ST-PK/GS 52

## ST-... /GS 60



ST-MH/GS 60  
ST-PK/GS 60

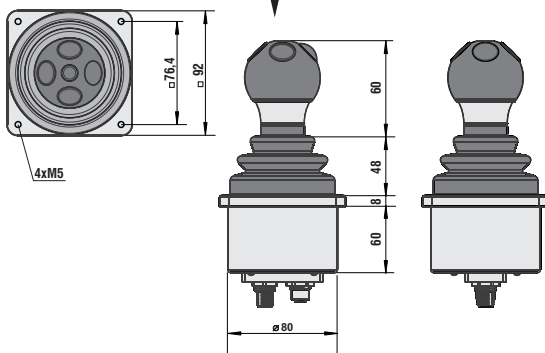
## ST-W/GS 78



e.g. with standard handle

### ST-MH/GS 80

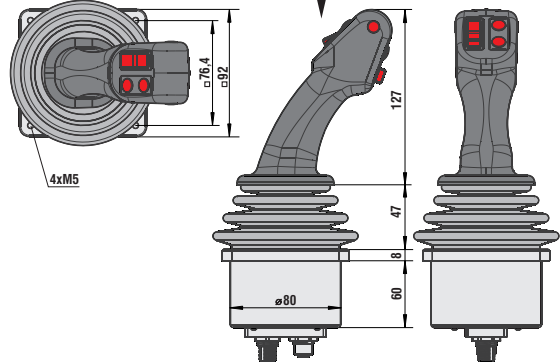
View X



Ball handle

### ST-MH/GS 80

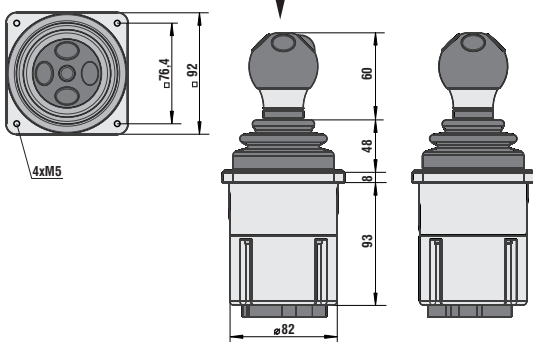
View X



Standard handle

### ST-W/GS 82

View X



e.g. with ball handle



Headquarter in Berlin

## Berlin

---

### Fernsteuergeräte

#### Kurt Oelsch GmbH

Jahnstraße 68 + 70

D-12347 Berlin

Phone +49 (0 30) 62 91 - 1

Fax +49 (0 30) 62 91 - 277



Factory in Kablow

## Kablow

---

### FSG Fernsteuergeräte

#### Meß- und Regeltechnik GmbH

OT Kablow

Mühlenweg 2-3

D-15712 Königs Wusterhausen

Phone +49 (0 33 75) 269 - 0

Fax +49 (0 33 75) 269 - 277



Factory in Heppenheim

## Heppenheim

---

### Fernsteuergeräte

#### Kurt Oelsch GmbH & Co.KG

Weierhausstraße 10

D-64646 Heppenheim

Phone +49 (0 62 52) 99 50 - 0

Fax +49 (0 62 52) 72 05 - 3



info@fernsteuergeraete.de  
www.fernsteuergeraete.de