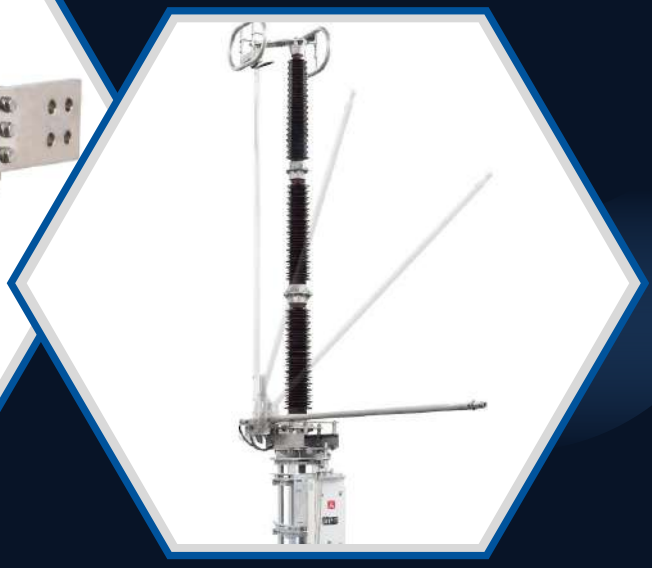
GÜRAL
Elektrik Malzemeleri Tic. ve San. A.Ş.



www.guralelektrik.com

About Us

Based in Istanbul, Güral Elektrik is one of the leading companies in the electromechanical industry. The foundations of the company were laid by the late Şehsuvar Menemencioğlu and the late Oğuz Güral, one of Turkey's first electrical network contractors. Güral Elektrik was restructured as Güral Elektrik Malzemeleri Ticaret ve Sanayi A.Ş. in 1991.

Güral Elektrik A.Ş. specializes in the production, marketing and sales of medium, high and very high voltage disconnectors, high voltage current limiting back-up fuses and safety products. In addition to having a high-capacity engineering research and development group within its own structure, it continues its technological collaborations with well-known foreign companies in the sector. In 1999, GÜRAL started a significant journey by commencing the production of high-voltage and very high-voltage disconnectors capable of handling voltages up to 420 kV and currents of up to 50 kA. This venture was made possible through a collaborative license agreement with Alpha Electrical Technology Ltd., which, as of 2016, became affiliated with Pfiffner AG under the name of Alpha Elektrotechnik Ltd. Since 2008, GÜRAL has embraced independent research and development, leveraging its in-house resources and activities to innovate disconnectors engineered to manage even more formidable challenges. These cutting-edge disconnectors are designed to operate with voltages reaching up to 550 kV and can handle currents of up to 63 kA. In addition to domestic sales, our products are delivered to the Far East, Western Europe and North African countries.

Centre-Break Disconnector (72,5 kV-550 kV)
(CBD)

GÜRAL Centre-Break Disconnectors (CBD) can be fitted parallel, inline, or even shifted crosswise layouts.

- **Type tested at independent laboratories in accordance with the IEC standards**
- **10.000 CO (main circuit), 5.000 CO (add-on earthing switch)**
- **Ambient temperature range: -50 °C, +55 °C**
- **Ice loading class: 20 mm**
- **Seismic withstand level: 1.0 g in compliance with IEEE 693, 2018.**

Ratings

Rated Voltage	kV	72,5	123(126)	145	170	245(252)	300	362(363)	420	550
Rated Current	A	1250-4000					2000-4000			
Rated Short-Duration Power-Frequency Withstand Voltage (50 Hz - 1 min.)	kV (R.M.S.)	140(1)(2) 160(3)	230(1)(2) 265(3)	275(1)(2) 315(3)	325(1)(2) 375(3)	460(1)(2) 530(3)	395(1)(2) 435(3)	450(1)(2) 520(3)	520(1)(2) 610(3)	620(1)(2) 800(3)
Rated Switching Impulse Withstand Voltage (250/2500 µs)	kV (Peak)	N.A.					850(1) 1275(2) 700(+245)(3)	950(1) 1425(2) 800(+295)(3)	1050(1) 1575(2) 900(+345)(3)	1175(1) 1760(2) 900(+450)(3)
Rated Lightning Impulse Withstand Voltage (1,2/50 µs)	kV (Peak)	325(1)(2) 375(3)	550(1)(2) 630(3)	650(1)(2) 750(3)	750(1)(2) 860(3)	1050(1)(2) 1200(3)	1050(1)(2) 1050(+170) (3)	1175(1)(2) 1175(+205) (3)	1425(1)(2) 1425(+240) (3)	1550(1)(2) 1550(+315)(3)
Rated Short-Time Withstand Current - Duration	kA (R.M.S.)	31,5-3s / 40-3s / 50-3s / 63-3s					50-3s / 63-3s			
Rated Peak Withstand Current	kA (Peak)	80 / 100 / 125 / 157,5					125 / 157,5			

(1): Phase-to-earth
(2):Between phases
(3): Across the isolating distance

Each pole consists of two rotating columns, silver-plated copper contacts, and terminals capable of being arranged in cylindrical or plate shape (with different hole patterns).

Ready to be equipped with one (CBDE) or two (CBDEE) earthing switches.

Motor and Hand Drive Mechanisms are applicable with flexible control and supply circuit designs to satisfy the customer requirements.

Knee-Type Disconnector (245 kV-550 kV)

(Horizontal Semi-Pantograph) (HBD)

GÜRAL Knee-Type Disconnectors (HBD) help site designers to reduce area usage by the low projection area between the phases and let them have a choice to decide on two-layer busbar applications due to its reduced open-height in comparison with vertical-breaks thanks to the hinged main circuit arm.

- **Type tested at independent laboratories in accordance with the IEC standards**
- **10.000 CO (main circuit), 5.000 CO (add-on earthing switch)**
- **Ambient temperature range: -50 °C, +55 °C**
- **Ice loading class: 20 mm**
- **Seismic withstand level: 1.0 g in compliance with IEEE 693, 2018.**

Ratings

Rated Voltage	kV	245(252)	300	362(363)	420	550
Rated Current	A	2000 - 4000				
Rated Short-Duration Power-Frequency Withstand Voltage (50 Hz - 1 min.)	kV (R.M.S.)	460(1)(2) 530(3)	395(1)(2) 435(3)	450(1)(2) 520(3)	520(1)(2) 610(3)	620(1)(2) 800(3)
Rated Switching Impulse Withstand Voltage (250/2500 µs)	kV (Peak)	N.A.	850(1) 1275(2) 700 (+245)(3)	950(1) 1425(2) 800(+295)(3)	1050(1) 1575(2) 900(+345)(3)	1175(1) 1760(2) 900(+450)(3)
Rated Lightning Impulse Withstand Voltage (1,2/50 µs)	kV (Peak)	1050(1)(2) 1200(3)	1050(1)(2) 1050(+170)(3)	1175(1)(2) 1175(+205)(3)	1425(1)(2) 1425(+240)(3)	1550(1)(2) 1550(+315)(3)
Rated Short-Time Withstand Current - Duration	kA (R.M.S.)	50-1s / 63-1s				
Rated Peak Withstand Current	kA (Peak)	125 / 157,5				

(1): Phase-to-earth
(2):Between phases
(3): Across the isolating distance

Each disconnector pole (HBDe) consists of two stationary and one rotating insulator columns, tubular aluminum profile current path hinged centrically, silver-plated copper contacts, and aluminum plate terminals appropriate for bolt connections in different hole patterns.

Ready to be equipped with one (HBDEe) or two (HBDEEe) earthing switches.

Motor and Hand Drive Mechanisms are applicable with flexible control and supply circuit designs to satisfy the customer requirements.

Pantograph Disconnector(72,5 kV-550 kV)

(TFP)

GÜRAL Pantograph Disconnectors (TFP/TFPA/TFPK/TFPK4) designed to ensure outstanding performances at the high, very high, and ultra-high voltage substations as one of the best solutions for connection and disconnection of upper and lower busbars, thanks to their extensive contact and small projection areas.

- **Type tested at independent laboratories in accordance with the IEC standards**
- **10.000 CO (main circuit), 5.000 CO (add-on earthing switch)**
- **Ambient temperature range: -50 °C, +55 °C**
- **Ice loading class: 20 mm**
- **Seismic withstand level: 1.0 g in compliance with IEEE 693, 2018.**

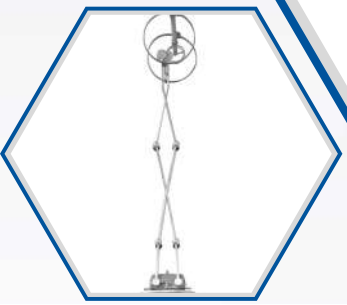
Ratings

Rated Voltage	kV	72,5	123(126)	145	170	245(252)	300	362(363)	420	550
Rated Current	A	1250-2500				2000-4000				
Rated Short-Duration Power-Frequency Withstand Voltage (50 Hz - 1 min.)	kV (R.M.S.)	140(1)(2) 160(3)	230(1)(2) 265(3)	275(1)(2) 315(3)	325(1)(2) 375(3)	460(1)(2) 530(3)	395(1)(2) 435(3)	450(1)(2) 520(3)	520(1)(2) 610(3)	620(1)(2) 800(3)
Rated Switching Impulse Withstand Voltage (250/2500 µs)	kV (Peak)	N.A.					850(1) 1275(2) 700(+245)(3)	950(1) 1425(2) 800(+295)(3)	1050(1) 1575(2) 900(+345)(3)	1175(1) 1760(2) 900(+450)(3)
Rated Lightning Impulse Withstand Voltage (1,2/50 µs)	kV (Peak)	325(1)(2) 375(3)	550(1)(2) 630(3)	650(1)(2) 750(3)	750(1)(2) 860(3)	1050(1)(2) 1200	1050(1)(2) 1050(+170)(3)	1175(1)(2) 1175(+205)(3)	1425(1)(2) 1425(+240)(3)	1550(1)(2) 1550(+315)(3)
Rated Short-Time Withstand Current - Duration	kA (R.M.S.)	31.5-3s / 40-3s / 50-1s				50-1s / 63-1s				
Rated Peak Withstand Current	kA (Peak)	80 / 100 / 125				125 / 157,5				

(1): Phase-to-earth
(2):Between phases
(3): Across the isolating distance

MultiContact integrated scissors and aluminum casting gearbox ensure the the highest reliability in current carrying against the nature and system rooted phenomenas; such as, earthquakes, short-circuits...etc.

Ready to be equipped with one (TFPEe) earthing switch.



Motor and Hand Drive Mechanisms are applicable with flexible control and supply circuit designs to satisfy the customer requirements.

Earthing Switch(72,5 kV-550 kV)

(EF)

GÜRAL Stand-Alone Type Earthing Switches are generally used at high-voltage substations in earthing of busbars to establish a secure bus section.

- **Type tested at independent laboratories in accordance with the IEC standards**
- **5.000 CO**
- **Ambient temperature range: -50 °C, +55 °C**
- **Ice loading class: 20 mm**
- **Seismic withstand level: 1.0 g in compliance with IEEE 693, 2018.**

Ratings

Rated Voltage	kV	72,5	123(126)	145	170	245(252)	300	362(363)	420	550
Rated Short-Duration Power-Frequency Withstand Voltage (50 Hz - 1 min.)	kV (R.M.S.)	140(1)(2)	230(1)(2)	275(1)(2)	325(1)(2)	460(1)(2)	395(1)(2)	450(1)(2)	520(1)(2)	620(1)(2)
Rated Switching Impulse Withstand Voltage (250/2500 µs)	kV (Peak)	N.A.					850(1) 1275(2)	950(1) 1425(2)	1050(1) 1575(2)	1175(1) 1760(2)
Rated Lightning Impulse Withstand Voltage (1,2/50 µs)	kV (Peak)	325(1)(2)	550(1)(2)	650(1)(2)	750(1)(2)	1050(1)(2)	1050(1)(2)	1175(1)(2)	1425(1)(2)	1550(1)(2)
Rated Short-Time Withstand Current - Duration	kA (R.M.S.)	31,5-3s / 40-3s / 50-1s / 63-1s								
Rated Peak Withstand Current	kA (Peak)	80 / 100 / 125 / 157,5								
Induced Current Switching Class		Class A / Class B (Optional)								

(1): Phase-to-earth
(2):Between phases

Capable of being adopted as a neutral point earthing switch with the rating of continuous current up to 1250 A.

Ready for Class A induced current switching without any attachments due to its design features. With additions of arc-extinguishing components, become capable of Class B switching.

Motor and Hand Drive Mechanisms are applicable with flexible control and supply circuit designs to satisfy the customer requirements.

Medium Voltage Outdoor and Indoor Applications (3,6 kV-52 kV)

GÜRAL Medium Voltage Outdoor and Indoor Disconnectors, Switch-Disconnectors and Earthing Switches have modular designs, allowing the generation of numerous combinations by application of already tested modules to supply standard and tailored solutions to customer requirements.

- **Vertical-break or centre-break based solutions**
- **Type tested at independent laboratories in accordance with the IEC standards**
- **10.000 CO (main circuit), 5.000 CO (add-on or stand-alone earthing switch)**
- **Ambient temperature range: -50 °C, +55 °C**
- **Ice loading class: 20 mm**
- **Seismic withstand level: 1.0 g in compliance with IEEE 693, 2018.**

Ratings

Type		HA-HT-HS-HST / DA-DT-DS-DST / HAY-HK						
Rated Voltage	**kV**	**3,6**	**7,2**	**12**	**17,5**	**24**	**36**	**52**
Rated Current	**A**	**630-4000** **300**(Limited by fuse link) **Switch-Disconnector** (HAY-HK) **: 630 A for 24 kV / 400 A for 36 kV**						
Rated Short-Duration Power-Frequency Withstand Voltage (50 Hz - 1 min.)	**kV** (R.M.S.)	**10**(1)(2) **12**(3)	**20**(1)(2) **23**(3)	**28**(1)(2) **32**(3)	**38**(1)(2) **45**(3)	**50**(1)(2) **60**(3)	**70**(1)(2) **80**(3)	**95**(1)(2) **110**(3)
Rated Lightning Impulse Withstand Voltage (1,2/50 µs)	**kV** (Peak)	**40**(1)(2) **46**(3)	**60**(1)(2) **70**(3)	**75**(1)(2) **85**(3)	**95**(1)(2) **110**(3)	**125**(1)(2) **145**(3)	**170**(1)(2) **195**(3)	**250**(1)(2) **290**(3)
Rated Short-Time Withstand Current / Duration	**kA** (R.M.S.)	**25-3s / 31,5-3s / 40-3s**						
Rated Peak Withstand Current	**kA** (Peak)	**63 / 80 / 100**						

(1): Phase-to-earth
(2):Between phases
(3): Across the isolating distance

Hot-dip galvanized base frames, high quality bearings and silver coated copper contacts and terminals are supplied as standard.

Add-on modules:

- **Earthing switch - one or two-set**
- **Fuse-base**
- **Fast-operating mechanism, if short-circuit-making feature is requested**

Insulator materials and types are selected by evaluation of the technical limits, and customer requirements:

- **Porcelain insulators (outdoor and indoor)**
- **Composite insulators with silicone housing (outdoor and indoor)**
- **Epoxy resin insulators (indoor)**

GÜRAL High Voltage Current Limiting Back-up Fuses are widely employed to protect overhead lines, power cables, motors, transformers, capacitor banks, and switching devices against thermal and dynamic effects of short-circuit currents and overload currents.

Railway Applications (27,5 kV)

GÜRAL Railway Applications consist of modules that are rooted in GÜRAL Medium Voltage Disconnectors and Earthing Switches designed, produced, and optimized based on the experiences of many years in service under various system and climate conditions.

- Vertical-break or centre-break based solutions
- Type tested at independent laboratories in accordance with the IEC standards
- 10.000 CO (main circuit), 5.000 CO (add-on or stand-alone earthing switch)
- Ambient temperature range: -50 °C, +55 °C
- Ice loading class: 20 mm
- Seismic withstand level: 1.0 g in compliance with IEEE 693, 2018.

Ratings

Type		HA-HT	HS-HSA-HST
Rated Voltage	kV	27,5	
Rated Current	A	1250-2000	630-1250
Rated Short-Duration Power-Frequency Withstand Voltage (50 Hz - 1 min.)	kV (R.M.S.)	95(1)(2) 110(3)	
Rated Lightning Impulse Withstand Voltage (1,2/50 µs)	kV (Peak)	250(1)(2) 290(3)	
Rated Short-Time Withstand Current / Duration	kA (R.M.S.)	25-3s / 31,5-3s / 40-3s	
Rated Peak Withstand Current	kA (Peak)	63 / 80 / 100	

(1): Phase-to-earth
(2):Between phases
(3): Across the isolating distance

Base frames, main circuits, earthing switches and fuse bases are made of same quality materials and workmanship as the high voltage and medium voltage products of GÜRAL.

27,5 kV generic products are dimensioned based on the voltage withstand levels designated for 52 kV rated voltage level by IEC 62271-1, and they are ready to be rearranged for lower-rated voltages of different railway systems.

In general applications, silicone-coated composite insulators are employed. In case of customer request, porcelain insulators are available.

Switch-Disconnector with Vacuum Interrupter (27,5 kV) (HVYA)

Ratings

Rated Voltage	**kV**	**27,5**
Rated Current	**A**	**2000**
Rated Short-Duration Power-Frequency Withstand Voltage (50 Hz - 1 min.)	**kV** (R.M.S.)	**95**(1)(2) **110**(3)
Rated Lightning Impulse Withstand Voltage (1,2/50 µs)	**kV** (Peak)	**250**(1)(2) **290**(3)
Rated Short-Time Withstand Current / Duration	**kA** (R.M.S.)	**31,5-3s**
Rated Peak Withstand Current	**kA** (Peak)	**82**

(1): Phase-to-earth
(2):Between phases
(3): Across the isolating distance

Switching Ratings

Mainly Active Load	**A**	**2000**
Closed-loop	**A**	**2000**
Cable-charging	**A**	**25**
Line-charging	**A**	**2.5**
Earth fault	**A**	**30**
Cable- and line-charging, under earth fault conditions	**A**	**17.4**
Rated Short-circit Making Current	**kA** (Peak)	**20**
Switching Operation Numbers		
Mainly Active Load	**C-O**	**100**
Short-circuit Making	**C**	**5**
Mechanical Endurance	**C-O**	**10000**

GÜRAL General Purpose Switch Disconnector with Vacuum Interrupter (HVYA) meets the highest switching requirements designated by IEC 62271-103 with the operational classes of E3, M2, and C2.

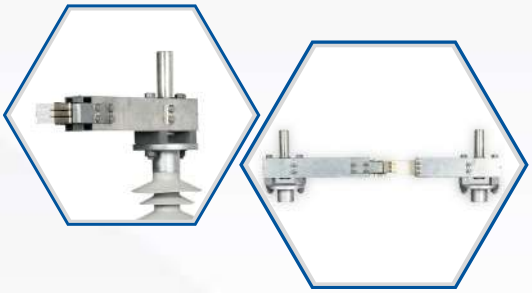
The Vacuum Interrupter is operated independently from the operating mechanism by the spring operation mechanism located in the switching chamber together with the interrupter. The switching chamber is made of aluminum housing, hollow insulator, stainless-steel operating parts manufactured by high precise machining.

The main circuit is made of silver-plated copper current path and terminals. Terminal plate hole patterns are supplied in compliance with the customer system's needs.

Motor and Hand Drive Mechanisms are applicable with flexible control and supply circuit designs to satisfy the customer requirements.

Centre Break Disconnector (27,5 kV)

(CBD27,5)



GÜRAL Centre-Break Disconnectors (CBD) for railway applications are adapted from GÜRAL high voltage disconnectors, consisting of the same superior properties and ready to be applied for any railway voltage rating.

- **Type tested at independent laboratories in accordance with the IEC standards**
- **10.000 CO (main circuit), 5.000 CO (add-on earthing switch)**
- **Ambient temperature range: -50 °C, +55 °C**
- **Ice loading class: 20 mm**

Ratings

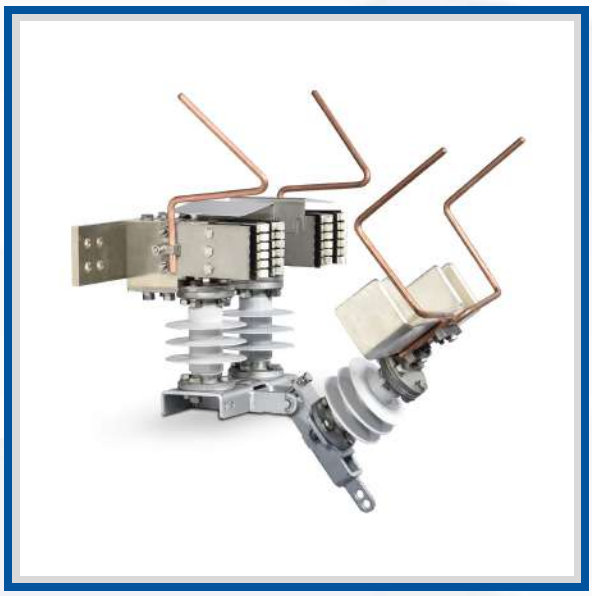
Rated Voltage	**kV**	**27,5**
Rated Current	**A**	**1250-3150**
Rated Short-Duration Power-Frequency Withstand Voltage (50 Hz - 1 min.)	**kV** (R.M.S.)	**95**(1)(2) **110**(3)
Rated Lightning Impulse Withstand Voltage (1,2/50 µs)	**kV** (Peak)	**250**(1)(2) **290**(3)
Rated Short-Time Withstand Current / Duration	**kA** (R.M.S.)	**31,5-3s / 40-3s / 50-1s**
Rated Peak Withstand Current	**kA** (Peak)	**80 / 100 / 125**

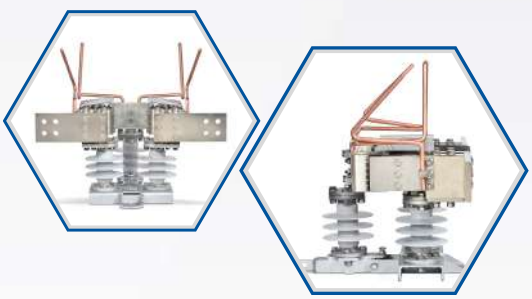
(1): Phase-to-earth
(2):Between phases
(3): Across the isolating distance

Motor and Hand Drive Mechanisms are applicable with flexible control and supply circuit designs to satisfy the customer requirements.

DC Tramway Disconnector(3000 V DC)

(TKU)





Tramway disconnectors are designed for any voltage level applied to tramway systems up to 4000 A.

- **Type tested at independent laboratories in accordance with the IEC standards**
- **10.000 CO (main circuit)**
- **Ambient temperature range: -50 °C, +55 °C**
- **Ice loading class: 20 mm**

Ratings

Rated Voltage	**V**	**3000**
Rated Current	**A**	**2000-4000**
Rated Short-Duration Power-Frequency Withstand Voltage (50 Hz - 1 min.)	**kV** (R.M.S.)	**18,5**(1)(2) **22.2**(3)
Rated Lightning Impulse Withstand Voltage (1,2/50 µs)	**kV** (Peak)	**40**(1)(2) **48**(3)
Rated Short-Time Withstand Current / Duration	**kA** (R.M.S.)	**40-1s**
Rated Peak Withstand Current	**kA** (Peak)	**100**

(1): Phase-to-earth
(2):Between phases
(3): Across the isolating distance

Ready to be equipped with one (TKUE) earthing switch.

Motor and Hand Drive Mechanisms are applicable with flexible control and supply circuit designs to satisfy the customer requirements.

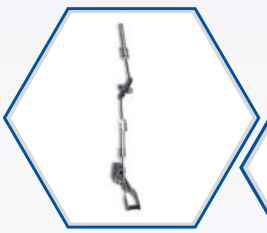
Motor Drive Mechanisms
(MD / MDHL)

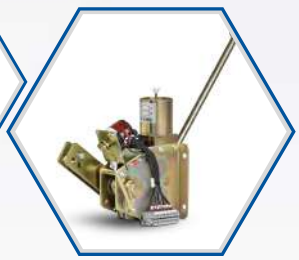
GÜRAL Motor Drive Mechanisms are capable of operating high and medium-voltage switches of various operation angles, system ratings, and climate conditions. Drives are type tested with/without high and medium voltage switches at independent laboratories in accordance with the IEC standards.

Ratings

Rated Motor Voltage	V	AC:220-230-380-400 DC:110-125-220
Rated Control Voltage	V (DC)	24-48-60-110-185-220
Protection Class	IP IK	55-65 10
Auxiliary Contacs	NO+NC	8NO+8NC 10NO+10NC 12NO+12NC 16NO+16NC
Cabinet Material	Aluminum / Stainless Steel	
Ambient Temperature Range	-50 °C, +55 °C	

Hand Drive Mechanisms
(HD / HK / DK)





GÜRAL Hand Drive Mechanisms are capable of operating high and medium-voltage switches of various operation angles, system ratings, and climate conditions.

Ratings

Rated Control Voltage	V (DC)	24-48-60-110-185-220
Protection Class	IP IK	55-65 10
Auxiliary Contacs	NO+NC	8NO+8NC 10NO+10NC 12NO+12NC
Cabinet Material	Aluminum / Stainless Steel	
Ambient Temperature Range	-50 °C, +55 °C	

GÜRAL Hand Drives are designed and produced with a wide range of complexity, from simple operating levers to highly-developed drive mechanisms, including control circuits adaptable based on customer requirements.

GÜRAL
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