Joystick Control Units

General Information
Design · Mode of Operation

Applications
The joystick is a control unit to be mounted on control panels, cabinets or other suitable housings. It is employed, where machine operations are controlled by hand, e. g. for cranes, large machinery, warehouses, conveyor systems.

There is a wide variety of applications, and even the most complicated job can be solved easily and precisely by means of a joystick switch. Handling is simple, since all movements correspond logically with the desired machine movements. For instance Up, Down, Right, Left.

Design and mode of operation
Miniature switches of the snap action type are used as contact blocks. Due to this kind of contact operation, there is always a definite contact condition given (open or closed), even with fine adjustments (inching).

Snap action contacts have the advantages over slow action contacts that by the definite contact condition, contact burn and load chatter is avoided. The life of the contacts, of the loads and of the drives is, therefore, considerably increased.

The contact blocks are mounted, in the various models of joysticks, either individually or in groups on the support plate. Thus, four actuating directions for maximum result. The grouping of the contact blocks depends on the desired machine movements. There can be provided, e. g., one step each in the four actuating directions; the individual contacts may be NO or NC. Another example: four actuating directions with two step each by using eight contact blocks, which may also be either NO or NC.

Further, the contact blocks may be of the tandem style (one on top of another). Thereby, two contacts are available for each actuating direction. In the two-step design, there are four contacts in each actuating direction.

These are examples only. Please check the various configurations given on pages H-6 to H-7.

The individual groups of contact blocks are operated over the actuating handle. The handle is composed of a steel tube with moulded-on plastic ball.

This ball is supported between a support plate and a bearing flange, both of plastic. By a special material selection, there is low friction, and maintenance is not necessary.

When the handle is operated, in the 1-step design, an actuating plate will be moved against the plunger of the contact block. Thereby, switching is achieved. In the 2-step design, two actuating plates will successively be moved against the plungers of the contact blocks, so that the contacts will be operated one after the other.

With the actuating handle, free all-around operation is also possible. By an appropriate rotary movement, it is possible to additionally operate an adjacent group of contact blocks. This can also be performed from the centre position.

From the operating side, the installed joystick is water and oil tight. On that side, a boot of a material being resistant against many oils and petrols, and a light-metal cover are situated. This cover is screwed to the support plate and to the panel.

For the identification of the desired function, four recesses are provided, into which legend plates can be inserted and potted with a transparent material.

The properly mounted joystick switch complies with IP 65 degree of protection to IEC 529/DIN 40 050. The open terminals are inside the housing or panel.

Cross guide plate
If only one group of contacts is desired to be operated, and unintentional operation of an adjacent group is to be prevented, a unit with a cross guide is recommended. The standard model allows for switching in four directions.
If only two directions are desired, the two other directions are blocked by moulded-on blocking pins (these pins normally serve as a protection of the actuating handle against being rotated).

The handle spring returns to the centre position after manual release.

A joystick unit equipped with cross guide plates is shown on page H-8.

"Deadman's" Handle
The standard handle is equipped with a solid plastic ball. Upon request, it can be furnished with a push button contact (so-called "deadman's" button). It is composed of two semi-spherical plastic parts screwed to each other. In the interior, a snap action switch with a NO contact is provided. Upon request: NC contact.

On top of the unit, a sealed push button is fitted being actuated by the operator's palm. Only by this actuation, an adequately interlocked machine is started. By reducing the hand pressure, the integrated switch will disconnect the circuit, and the machine is stopped.

The deadman's button is rigidly connected with the actuating handle. In order to facilitate wiring, two flexible leads are wired to the switch already, and are guided through the handle tube.

The deadman's button can also be furnished separately.

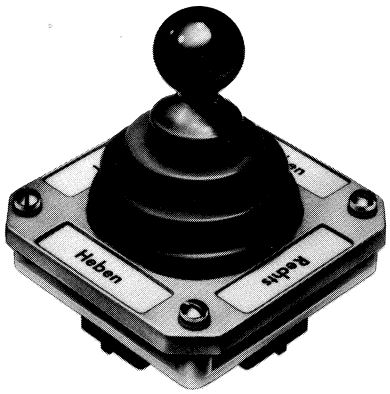
Please observe the illustrations and the further information about this subject on page H-8.

Technical Data Joystick Control Unit

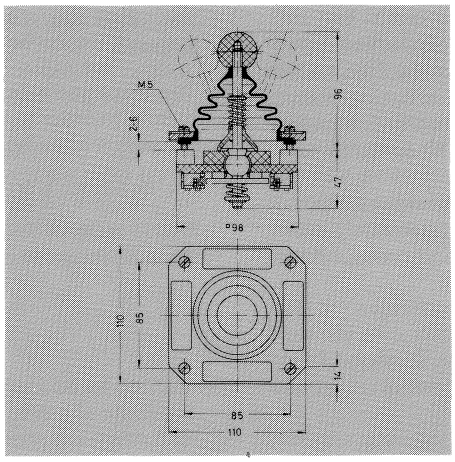
Contact system:	Snap action
Types of contacts:	NO or change-over contacts
Contact material:	Fine silver, double break
Insulation:	Conforming to VDE 0110, group C
Thermal test current I_{th}:	6 A
Rated insulation voltage U_i:	250 VAC (with deadman's button 42 VAC)
Rated operational current I_e (AC 11):	4 A (220 VAC)
Short-circuit protection:	10 A (time delay), 16 A (non-time delay)
Type of terminals:	Universal terminals (screw, solder or quick connect), for models HLU 110-12 to HLU 110-20: change-over switch with quick connect terminals only
Mode of operation:	1-step at approx. 20° 2-step at approx. 10° and 20° All-around operation (360°) or cross operation (4 x 90°)
Operating temperature:	– 20 to + 65° C (– 4 to + 150° F)

Joystick Control Units · HLU 110-1 to HLU 110-10

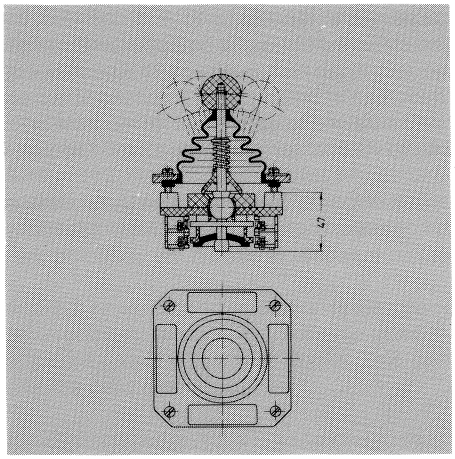
1-step and 2-step
6 A 250 VAC



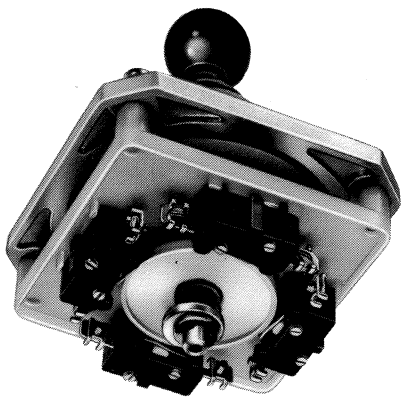
Joystick control unit
Type HLU 110-1



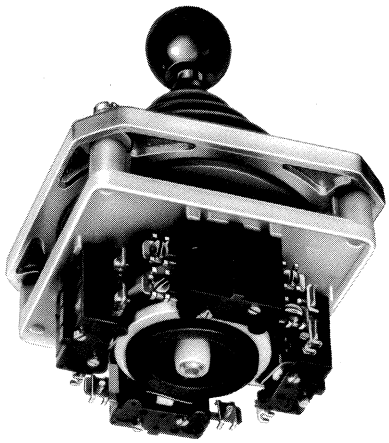
1-step design
Types **HLU 110-1** to **HLU 110-4.**
These units are employed for standard control jobs with 4 actuating directions max.
Forward – Reverse – Right – Left.
The contact blocks are arranged in a plane, each 90° apart – operation is effected by an actuating plate.
All switching directions are 1-step.



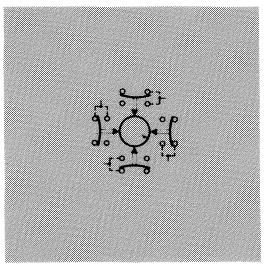
2-step design
Types **HLU-5** to **HLU 110-10.**
These units are intended for more precise control jobs.
The contact blocks (4 x 90°) are in two different planes. They are operated in two steps by two different actuating plates.
E. g. Up 1 and 2 – Down 1 and 2 – Left 1 and 2 – Right 1 and 2.



1-step design
Type HLU 110-1



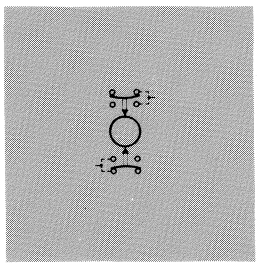
2-step design
Type HLU 110-5



HLU 110-1
4 NO

HLU 110-2
4 change-over

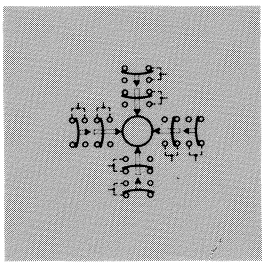
Weight approx. 400 g



HLU 110-3
2 NO

HLU 110-4
2 change-over

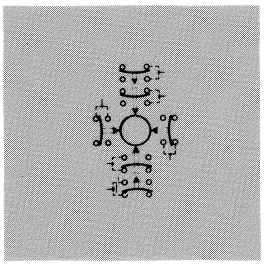
Weight approx. 370 g



HLU 110-5
8 NO

HLU 110-6
8 change-over

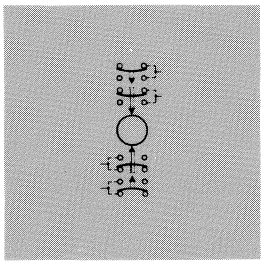
Weight approx. 470 g



HLU 110-7
6 NO

HLU 110-8
6 change-over

Weight approx. 440 g



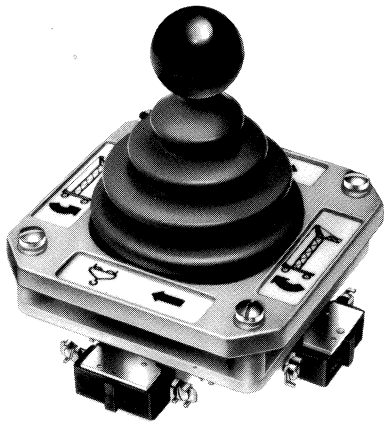
HLU 110-9
4 NO

HLU 110-10
4 change-over

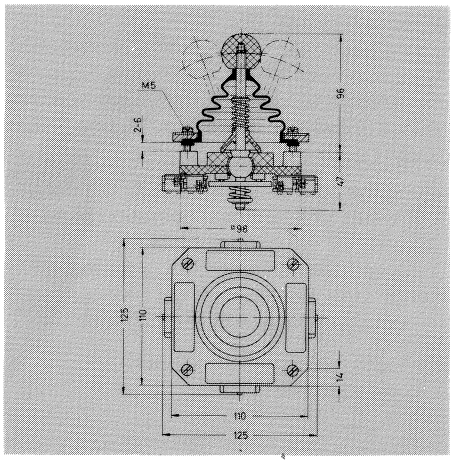
Weight approx. 410 g

Joystick Control Units · HLU 110-1 to HLU 110-20

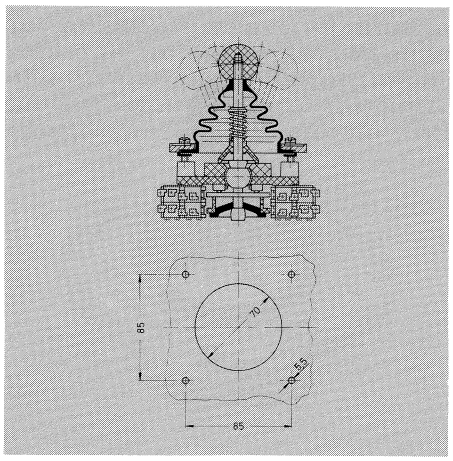
1-step and 2-step in Tandem Style
6 A 250 VAC



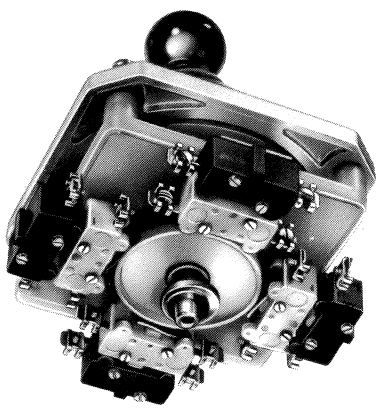
Joystick Control Unit
Type HLU 110-11



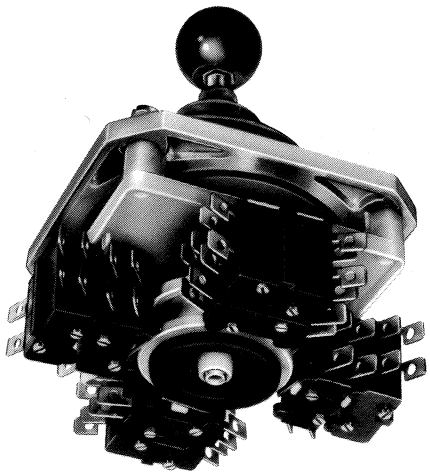
1-step tandem design
Types **HLU 110-11** to **HLU 110-14.**
These units are employed, when e. g. for technical reasons, two different circuits have to be switched in one actuating direction. Two contact blocks are stacked, one on top of the other, per actuating direction, the first one simultaneously actuating the second one over a passing – through plunger.



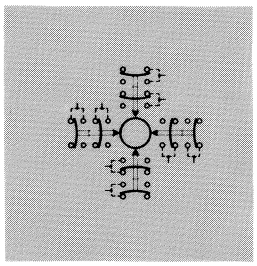
2-step tandem design
Types **HLU 110-15** to **HLU 110-20.**
The units are also tandem style, however in two steps. The contact blocks are provided in two planes. Up to a maximum of four contact blocks can be used per actuating direction.



1-step tandem design
Type HLU 110-11



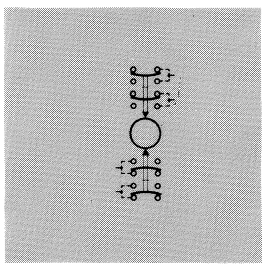
2-step tandem design
Type HLU 110-16



HLU 110-11
8 NO

HLU 110-12
8 change-over

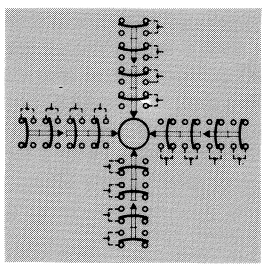
Weight approx. 470 g



HLU 110-13
4 NO

HLU 110-14
4 change-over

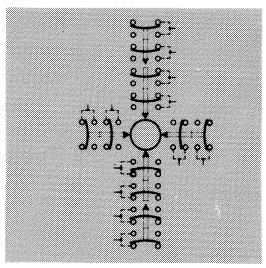
Weight approx. 420 g



HLU 110-15
16 NO

HLU 110-16
16 change-over

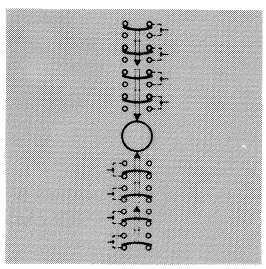
Weight approx. 570 g



HLU 110-17
12 NO

HLU 110-18
12 change-over

Weight approx. 520 g



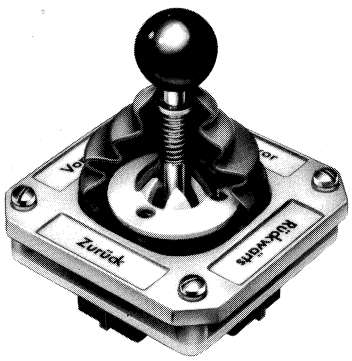
HLU 110-19
8 N

HLU 110-20
8 change-over

Weight approx. 460 g

Joystick Control Units with Cross Guide Plate

"Deadman's" Handle
"Deadman's" Button (Separate)

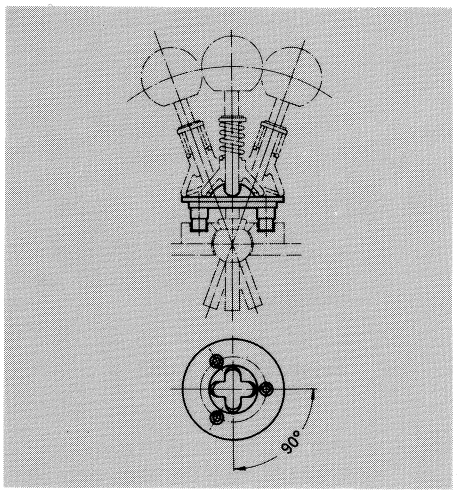


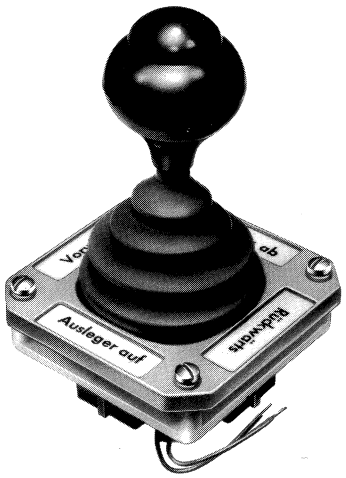
HLU 110-...**K**
with cross guide plate

Cross guide plate

The cross guide plate allows actuation allong the coordinate axes (4 x 90°) only. It prevents unintentional operation of adjacent contact blocks.
It is used, further, when, e. g., the movements "Up – Down" must not be engaged simultaneously with "Left – Right".

Ordering example: **HLU 110-1K**



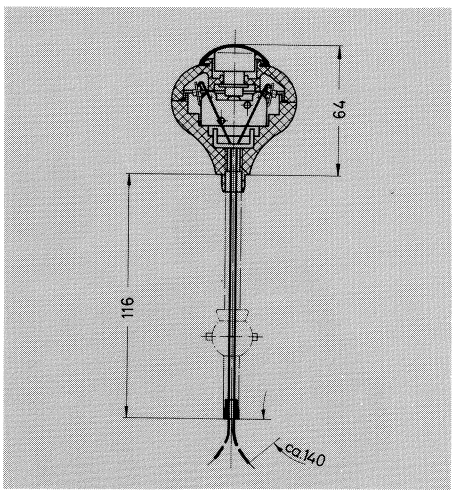


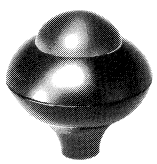
HLU 110-...**I**
with "deadman's" button

"Deadman's" handle

The "deadman's" button is required, if an electrical interlocking of the control system is desired.
The machine can only be set in operation, after the push button contact (NO with snap action) in the handle has been actuated over the palm of the operator's hand.
By reducing the hand pressure, the switch immediately cuts off.

Ordering example: **HLU 110-1T**
Ordering example NC: **HLU 110-1T01**



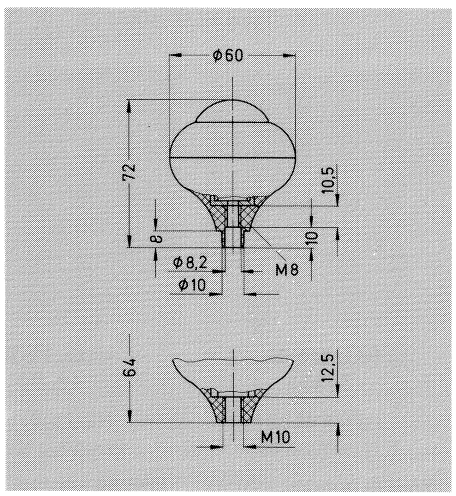


"Deadman's" button
T01 / M10

"Deadman's" button

The "deadman's" button can also be furnished separately. Electrical rating of the switch is then 6 A 250 VAC. It is available with 1 NO contact (screw terminal, black sealing cap) or with 1 NC contact (solder terminals, red sealing cap).
The button is provided with a thread M8 or alternatively M10.

Ordering examples "deadman's" button:
M 8 / NO: T
M 8 / NC: T01
M10 / NO: T/M10
M10 / NC: T01/M10



Portable Control Stations

Design · General Information Applications · Technical Data

Applications
It is often not possible to control machines or installations from a wall-mounted switch-board. It may be necessary, e. g. for cranes, to perform all or certain control actions, where the whole installation is visible. Other applications are, e. g., loading and unloading of ships.
For these and similar applications, portable control stations are preferably used.

Design
There are two basic designs available:
1. Type HG**T** 130 with attached, adjustable shoulder carrying strap;
2. Type HG**A** 130 with suspension lugs and carrying handle as pendant type station.

The rugged, sea-water resistant light metal bodies are composed of a lower and an upper section. All control elements and accessories are in the upper section.

The control elements for the portable control station are two joystick control units of the HLU 110-1 to HLU 110-10 series. Tandem style is not possible for the HG. units.

The vast variety of options available for these control stations are described on pages H-4 to H-6 and H-8. In addition, the control station can be provided with a maximum of three pilot devices: pushbuttons, key-operated buttons, illuminated pushbuttons, indicating lights or toggle switches. For more detailed information see page H-12.

The control station is watertight to IP 65 per IEC 529/DIN 40 050. This will be reduced to IP 40 when mounting a key-operated button.

The connection cable is introduced over a Pg 21 or Pg 29 cable gland; resp. A strain relief is provided inside the housing. There is also a cable protector available.

Practical experiences have shown that it is nearly impossible to create a part number system for these control stations, due to the large number of possible variations. So please build up the control station you require from the components described on pages H-6, H-8, H-11, H-12 and H-14. The illustrations and the table on page H-14 will help you.

Technical Data

Body material:	Light metal, sea-water resistant
Models:	With carrying strap or pendant type with suspension lugs and carrying handle
Surface protection:	Chromated and brown enamel finished RAL 8019
Cable entry:	Pg 21 or Pg 29 or cable protector (for Pg 21)
Degree of protection:	IP 65 to IEC 529/DIN 40 050
Control elements:	Joystick control units HLU 110-1 to HLU 110-10
Accessories:	Pushbuttons, key-operated buttons, illuminated pushbuttons, indicating lights, toggle switches