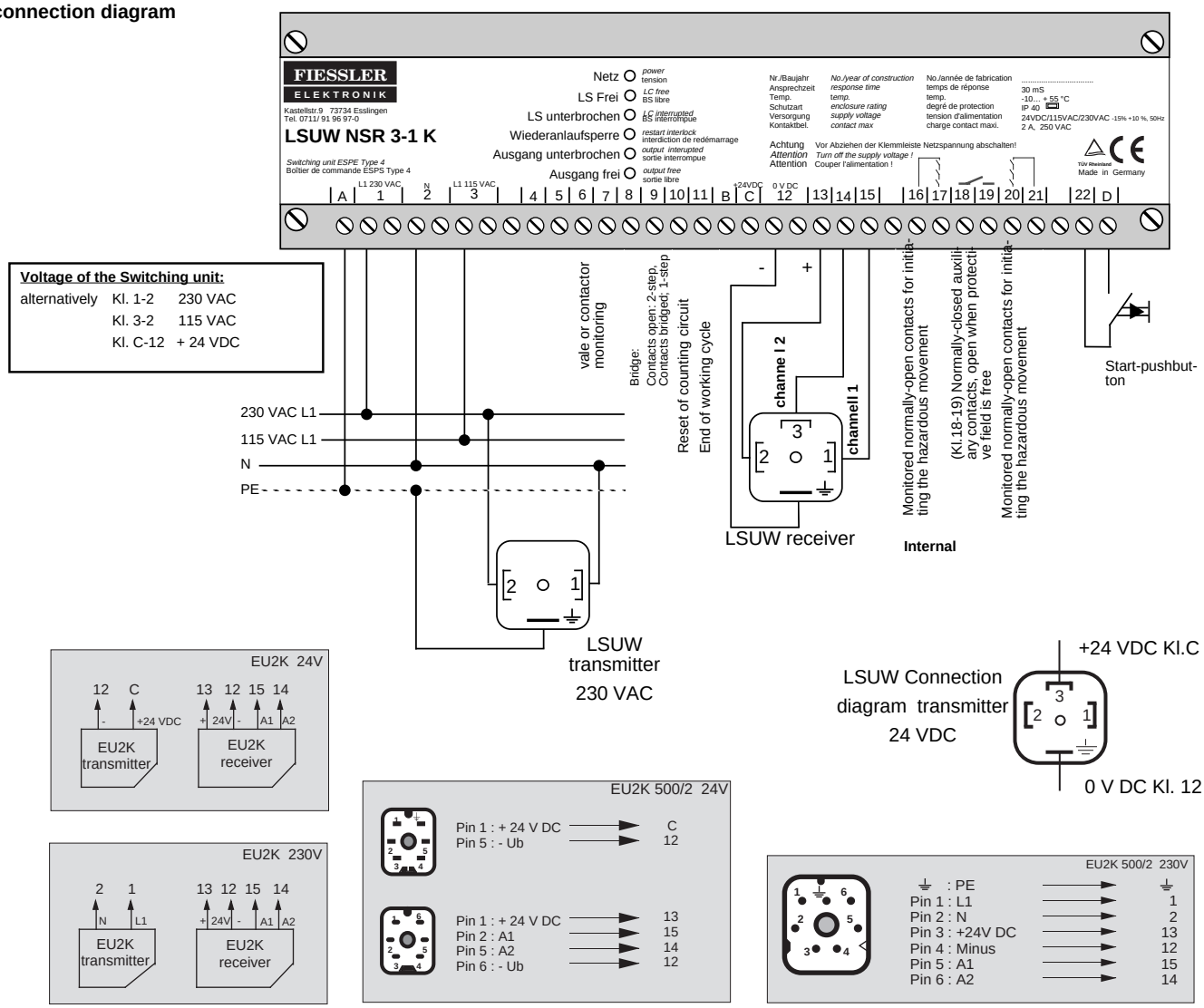
Connection diagram for Switching Unit LSUW NSR 3-1 K

General Information

The Switching unit LSUW NSR 3-1K may be operated with 230 V AC or 115 V AC with a 230 V AC-transmitter or with 24 V DC with a 24 V DC transmitter.

connection diagram



The working-current supply that initiates the hazardous movement is connected by way of terminals 16-17 and 20-21.

Switching function: two normally-open, floating, monitored forced-opening contacts.

The output contacts are floating contacts whose charge must not exceed 2A/250 V AC or 60 V DC , 30 W.

In the event of an inductive charge, a spark-quenching element (e.g. 0.22µF, 220 Ω) must be connected parallel to the charge (not to the contacts).

No external potential must be applied to the terminals 4, 5, 6, 7, 8, 9, 10, 11, D, and 22.

To increase the reliability of switching, double contacts should be used for interruption of the hazardous movement.

The hazardous movement of the working machine must only be switched by way of the working-current path, terminals 16 - 17 and 20 - 21.

The output 18 - 19 serves as a monitoring path. It must not be used as a contact to initiate the hazardous press-closing movement

When any electrical welding work is to be done on the machine, the switching unit should be disconnected and the plug connecting the light receiver be withdrawn as, otherwise, stray welding current could destroy the electronic components contained in these devices.

Connection Diagram for Switching Unit LSUW NSR 3-1 K

Operating Mode "A"

Function **Protective and control operation with cyclic entry into the safety area (1-stroke or 2-stroke operation)**

Application Cyclic operation with 30 second delay monitoring for the control of presses with a table height exceeding 750 mm for manually inserted workpieces.

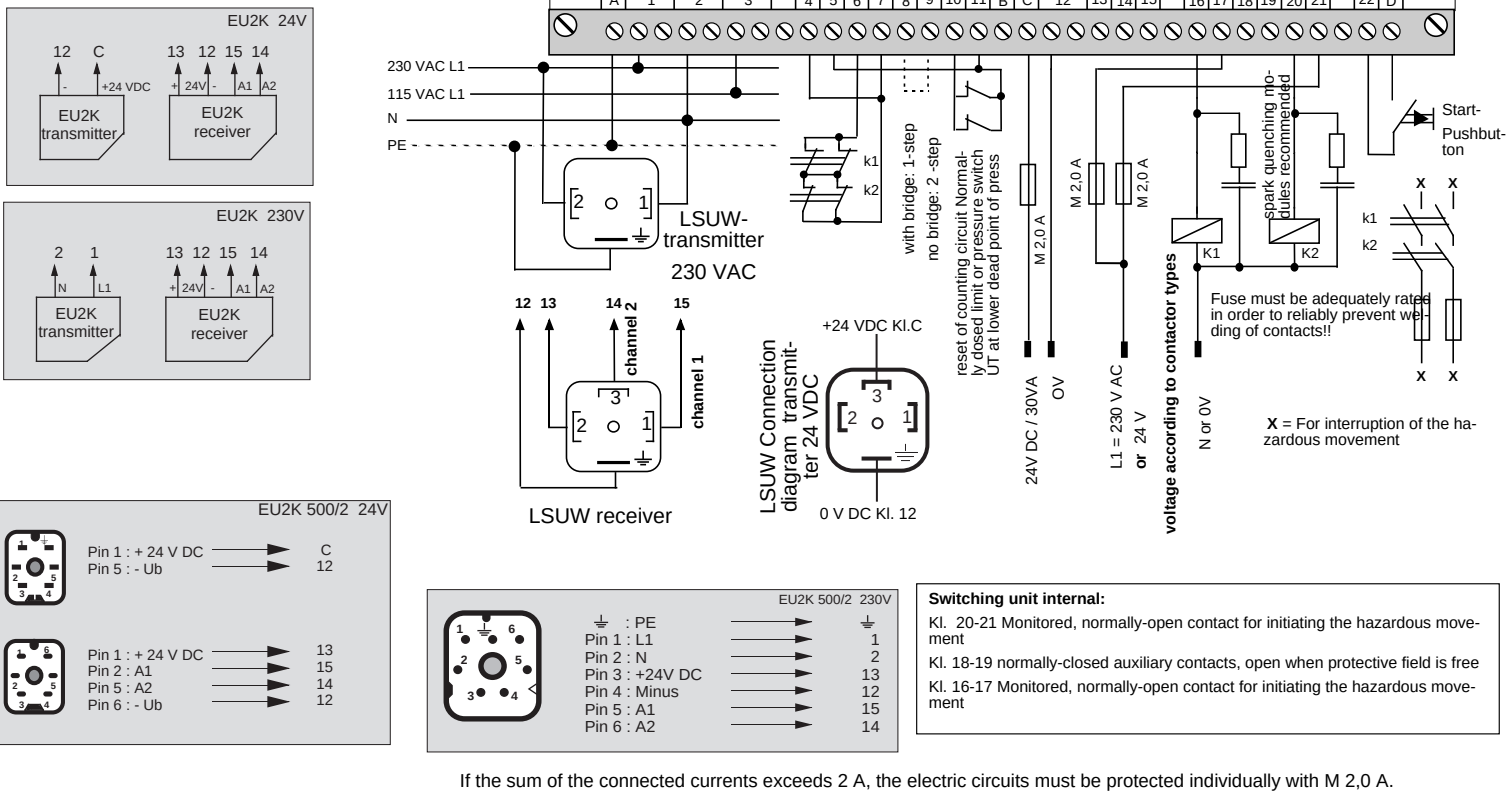
Example The press makes a working stroke after the operator has reached once or twice (programmable) into the protective field while the press is stopped at its upper dead point. If the operator reaches into the protective field during the hazardous closing movement, the press reverses immediately and returns to its upper dead point. Renewed operation is then only possible after pressing the "Start" pushbutton and testing the light barrier by reaching once or twice into the protective field.

Operating mode A must not be used if it is possible for a person to stand between the safety light curtain and the press .

Connection diagram

Voltage of the switching Unit

alternatively Kl. 1-2 230 VAC
Kl. 3-2 115 VAC
Kl. C-12 + 24 VDC



Switching unit internal:

Kl. 20-21 Monitored, normally-open contact for initiating the hazardous movement

Kl. 18-19 normally-closed auxiliary contacts, open when protective field is free

Kl. 16-17 Monitored, normally-open contact for initiating the hazardous movement

If the sum of the connected currents exceeds 2 A, the electric circuits must be protected individually with M 2,0 A.

How the system works

After switching on the press, the system must be tested by reaching into the protective field. After pressing the "Start" pushbutton while the protective field is free and then reaching once or twice into the protective field and then withdrawing, the current circuit 16-17 must close. The monitoring circuit 6-7 effects an additional check of the state of the hydraulic valves or contactors that initiate the hazardous movement. The initiation of a new working stroke or movement is only possible if reaching into the protective field resulted in both contactors or valves Kc1 and Kc2 dropping out and if the protective field is free again.

In cases where the closing movement of the press is initiated by contactors Kc1 and Kc2 the normally-open contacts of Kc1 and Kc2 are to be connected in series.

The output 18 - 19 serves as a monitoring path. It must not be used as a contact to initiate the hazardous press-closing movement.

If there is a delay of 30 seconds before the next occasion of reaching into or clearing the protective field, the process monitoring feature prevents restarting of the press.

Resetting of the stroke counting circuit is effected by briefly interrupting the connection between terminals 10 - 11 (approx. 20 ms) by means of a switch on the machine.

The "Start pushbutton" connection (Terminals D - 22), the normally-closed Kc1 and Kc2 monitoring contacts (Terminals 6 - 7) and the contacts for "resetting the counter circuit" (Terminals 10 - 11) are for switching low voltages at low current rates. The contacts must be considered as floating contacts and be dimensioned accordingly (preferably twin contacts).

It is required by prEN 50100 that on switching from one operating mode to another, the restart interlock must be activated. This requirement can be met by switching off the transmitter during the changeover.

Connection diagram Switching unit LSUW NSR 3-1 K

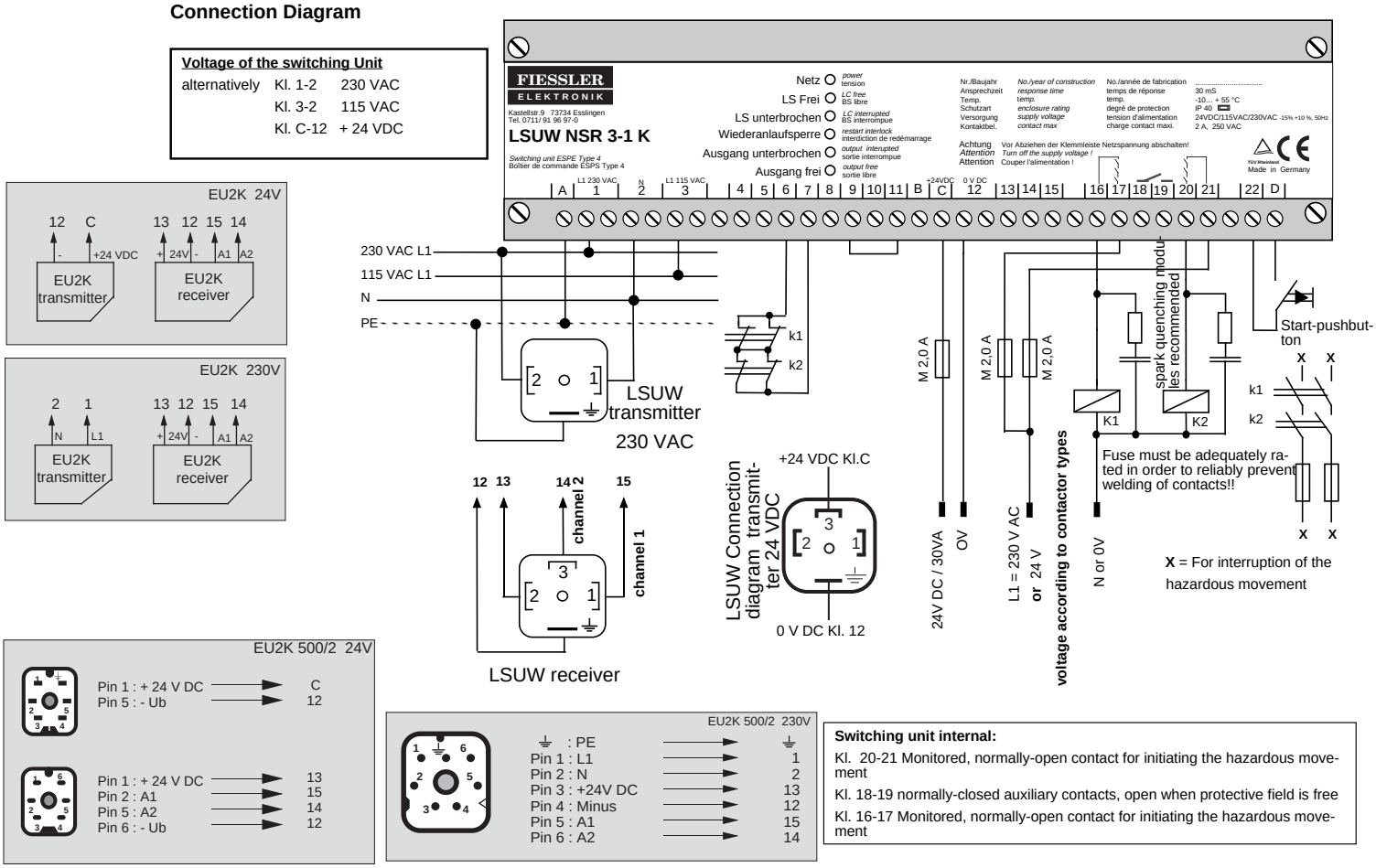
Operating Mode "B"

Function **Protective and control operation with restart interlock during the entire cycle**

Application For applications where cyclic reaching into the protective field is required. See, for example, ZH 1/281 and ZH 1/597.

Example Presses with a table height of less than 750 mm without additional protective devices, with which there is no control system and high-speed automatic punching machines where cyclic testing is not necessary.

Connection Diagram



How the system works If the sum of the connected currents exceeds 2 A, the electric circuits must be protected individually with M 2,0 A.

After switching on the machine concerned, the system must be tested by reaching into the protective field. When the "Start" pushbutton is pressed, so long as the protective field is free, current paths 16 - 17 and 20 - 21 must close.

If anyone reaches into the protective field, the machine stops immediately and can only be restarted after the "Start" pushbutton has been pressed once again.

The monitoring circuit 6-7 effects an additional check of the state of the hydraulic valves or contactors that initiate the hazardous movement. The initiation of a new working stroke or movement is only possible if reaching into the protective field resulted in both contactors or valves Kc1 and Kc2 dropping out and if the protective field is free again.

In cases where the closing movement of the press is initiated by contactors Kc1 and Kc2 the normally-open contacts of Kc1 and Kc2 are to be connected in series.

The output 18 - 19 serves as a monitoring path. It must not be used as a contact to initiate the hazardous press-closing movement.

The "Start pushbutton" connection (Terminals D - 22), the normally-closed Kc1 and Kc2 monitoring contacts (Terminals 6 - 7) are for switching low voltages at low current rates. The contacts must be considered as floating contacts and be dimensioned accordingly (preferably twin contacts).

The "Start" pushbutton must be fitted in a position from where the hazardous area can be easily surveyed, and where the pushbutton cannot be actuated from the hazard area without interrupting the light barrier.

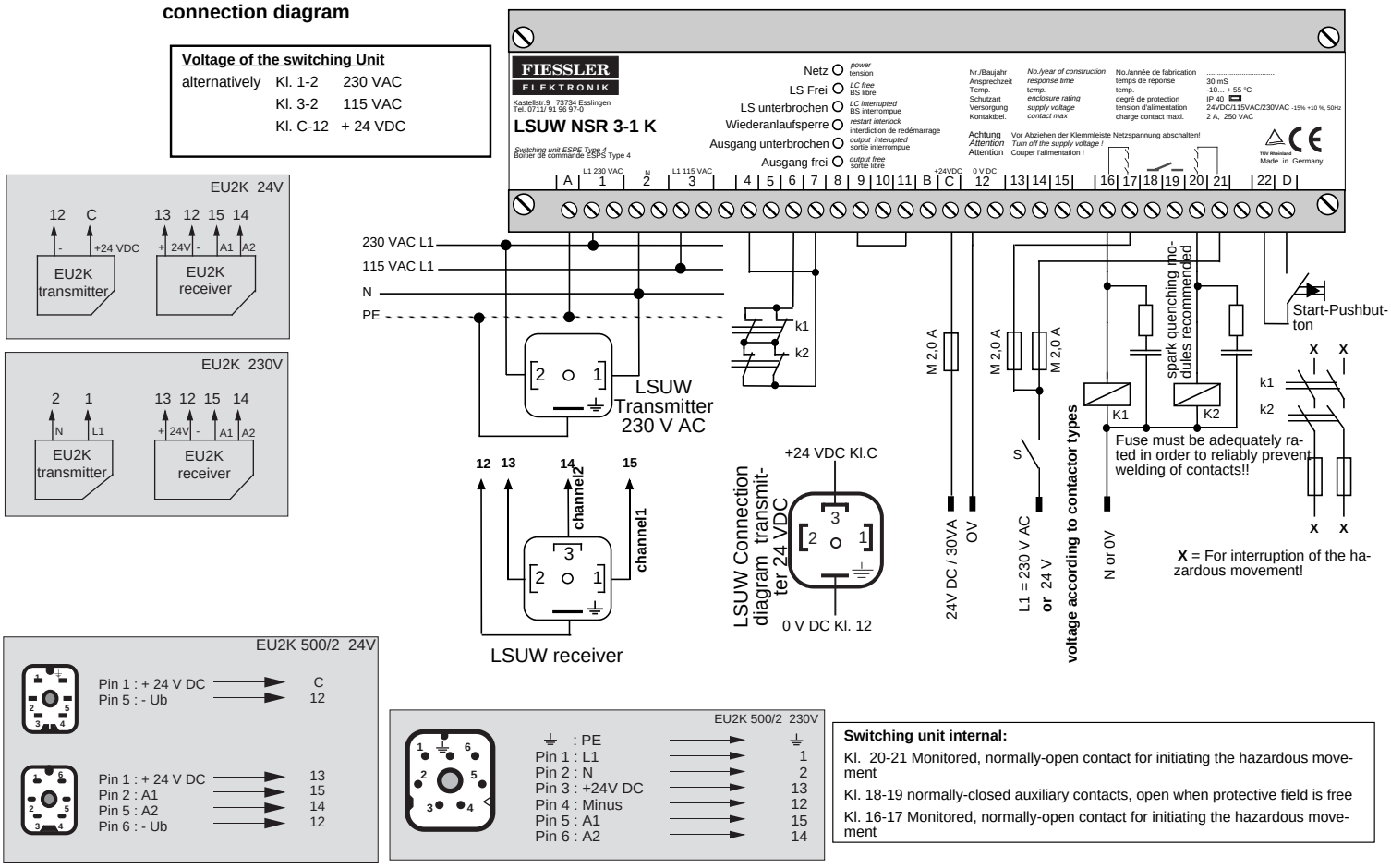
Connection diagram Switching unit LSUW NSR 3-1 K

Operating Mode "B1"

Function **Protective and control operation with restart interlock during the process movement**

Operating mode B1 must not be used if it is possible for a person to stand between the safety light curtain and the machine !!

connection diagram



Switching unit internal:

Kl. 20-21 Monitored, normally-open contact for initiating the hazardous movement

Kl. 18-19 normally-closed auxiliary contacts, open when protective field is free

Kl. 16-17 Monitored, normally-open contact for initiating the hazardous movement

If the sum of the connected currents exceeds 2 A, the electric circuits must be protected individually with M 2,0 A.

How the system works

If anyone should reach into the protective field while the machine is making the hazardous movement, the movement is stopped immediately and restarting is only possible after the "Start" pushbutton has been pressed once again.

When the machine is at rest (Switch "S" open) or during the non-hazardous opening movement, there is free access to the machine without the requirement to press the "Start" pushbutton before restarting is possible.

After switching on the machine, the system must be tested by reaching into the protective field. After pressing the "Start" pushbutton, while the protective field is free, the current paths 16 - 17 and 20 - 21 close.

The monitoring circuit 6-7 effects an additional re-check of the state of the hydraulic valves or contactors that initiate the hazardous movement.

The initiation of a new working stroke or movement is only possible if both contactors or valves Kc1 and Kc2 have dropped and consequently the protective field is free again, after reaching into the protective field.

In cases where the closing movement of the press is initiated by contactors Kc1 and Kc2 the normally-open contacts of Kc1 and Kc2 are to be connected in series.

The output 18 - 19 serves as a monitoring path. It must not be used as a contact to initiate the hazardous press-closing movement.

The "Start pushbutton" connection (Terminals D - 22) and the normally-closed Kc1 and Kc2 monitoring contacts (Terminals 6-7) are for switching low voltages at low current rates. The contacts must be considered as floating contacts and be dimensioned accordingly (preferably twin contacts).

Connection diagram Switching unit LSUW NSR 3-1 K

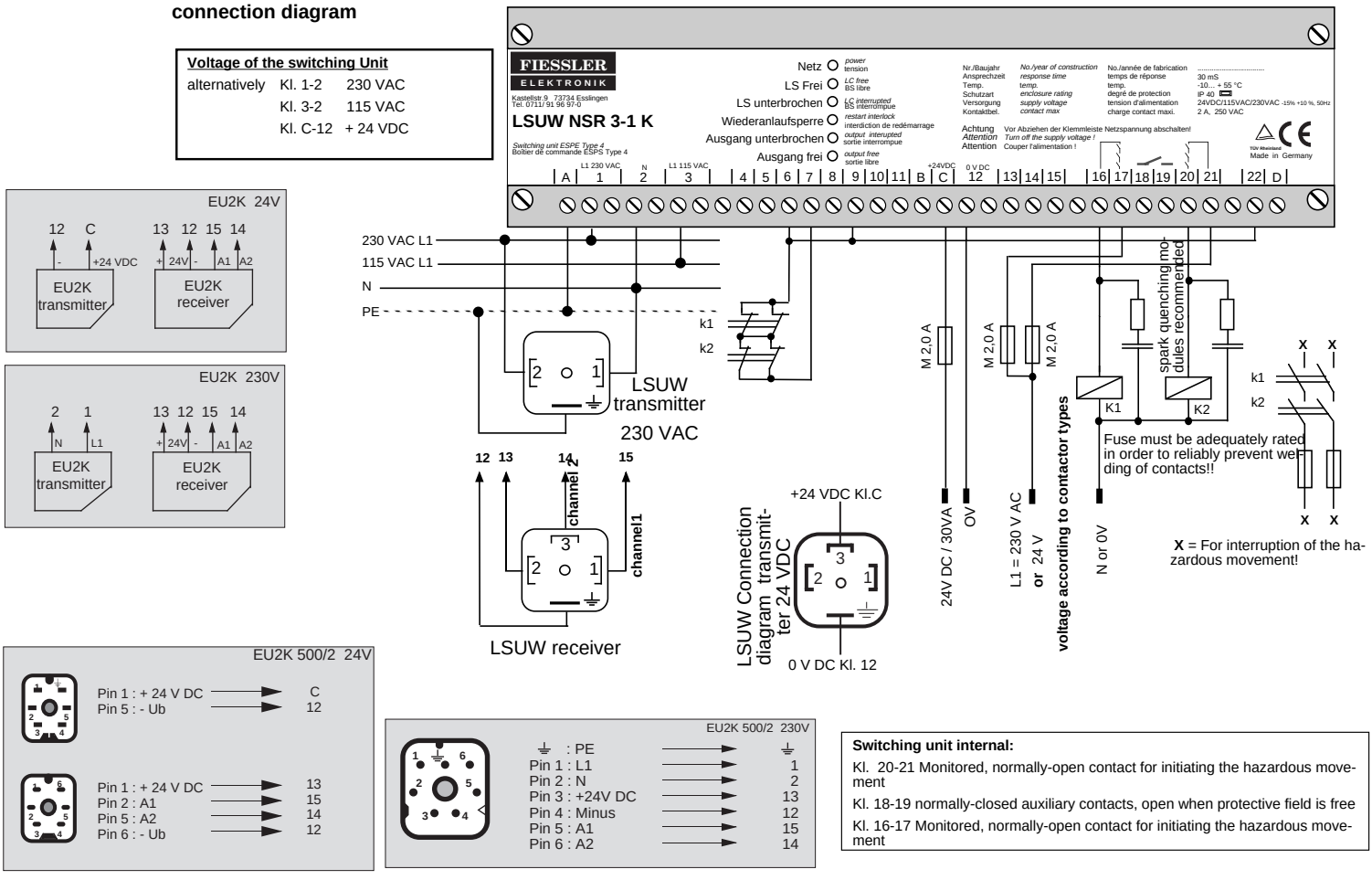
Operating mode "C"

Function **Protective and control operation without restart interlock, with valve or contactor monitoring on power-driven machines. See, for example, ZH 1/597.**

Application To provide protection in the vicinity of power driven machines or to effect a restart disable in the machine control.

Operating mode C must not be used if it is possible for a person to stand between the safety light curtain and the machine.

connection diagram



Switching unit internal:

Kl. 20-21 Monitored, normally-open contact for initiating the hazardous movement

Kl. 18-19 normally-closed auxiliary contacts, open when protective field is free

Kl. 16-17 Monitored, normally-open contact for initiating the hazardous movement

If the sum of the connected currents exceeds 2 A, the electric circuits must be protected individually with M 2,0 A.

How the system works

After switching on the machine, the system must be tested by reaching into the protective field. On withdrawal from the protective field, the contacts between Terminals 16 - 17 and 20 - 21 close while Terminals 18-19 are interrupted.

Output 18 - 19 serves as a monitoring path. It must not be used as a contact to initiate the hazardous press-closing movement.

On penetration of the protective field, current paths 16 - 17 and 20 - 21 open while current path 18 - 19 closes.

The monitoring circuit 6-7 effects an additional check of the state of the hydraulic valves or contactors that initiate the hazardous movement.

The switch connection of the normally-closed monitoring contacts (Terminals 6 - 7), are for switching low voltages at low current rates.

The contacts must be considered as floating contacts and be dimensioned accordingly (preferably twin contacts).

Connection diagram Switching unit LSUW NSR 3-1 K

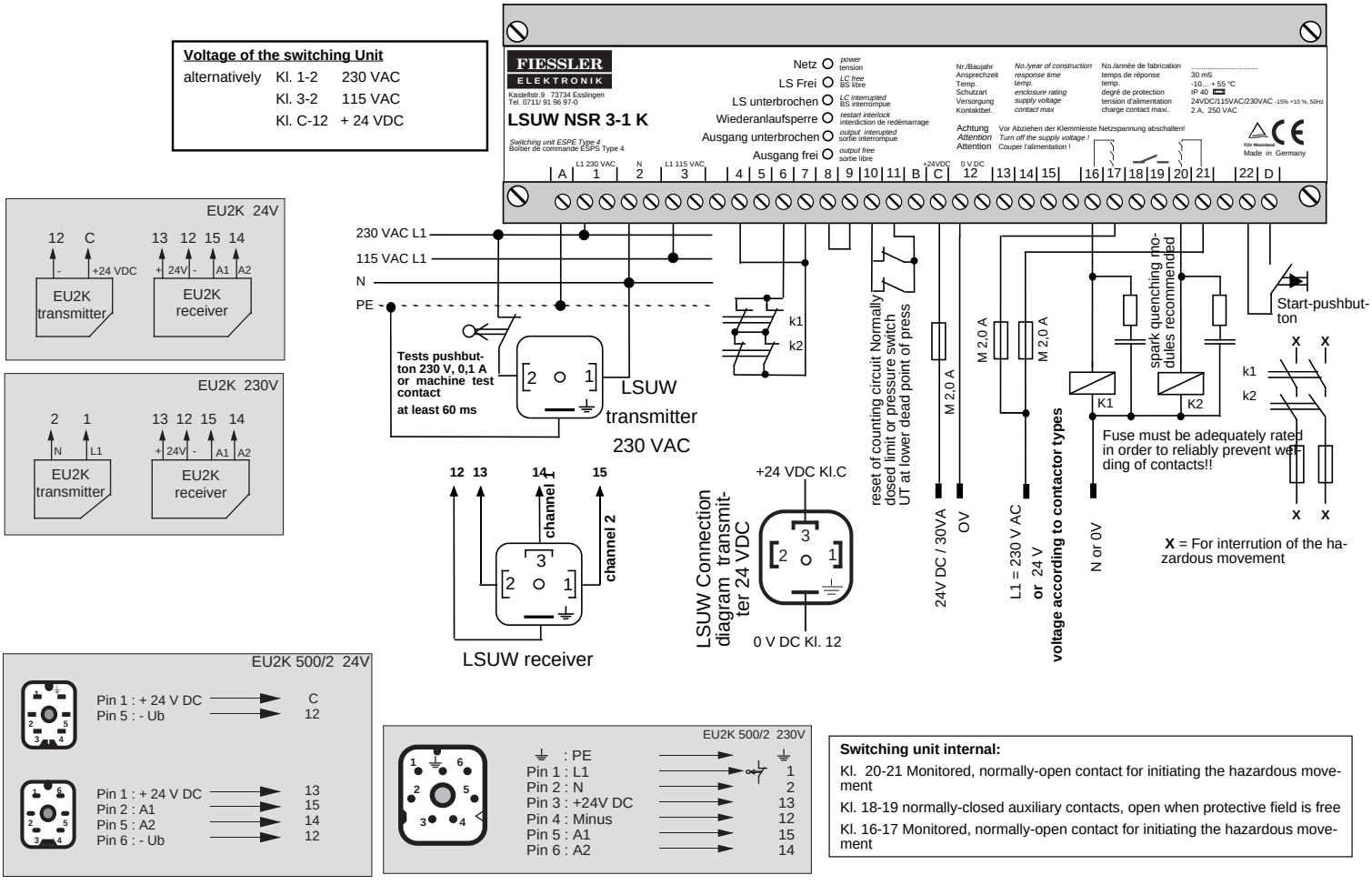
operation mode "D"

Function **Protective and control operation with restart interlock and cyclic testing**

Application e.g. for protection at the rear of a press without cyclic reaching into the protective field. See, for example, ZH 1/281 4.6

Operating mode D must not be used if it is possible for a person to stand between the safety light curtain and the machine .

Connection Diagram



Switching unit internal:

Kl. 20-21 Monitored, normally-open contact for initiating the hazardous movement

Kl. 18-19 normally-closed auxiliary contacts, open when protective field is free

Kl. 16-17 Monitored, normally-open contact for initiating the hazardous movement

If the sum of the connected currents exceeds 2 A, the electric circuits must be protected individually with M 2,0 A.

How the system works

Usually, the operator reaches once or several times into the protective field during every working cycle. By doing so, the system is continuously tested but in automatic operation this action is not necessary and therefore the light-barrier system often remains untested for several hours.

It is, however, frequently required that the system is tested before each operating cycle and that this testing has to be initiated by the machine itself.

This is effected by a switch on the machine that briefly interrupts the connection between terminals 10 - 11 (approx 20 ms) to reset the counting circuit, and that also interrupts the connections between 16 - 17 and 20 - 21. A wipe pulse of at least 60 ms causes the power supply to the light transmitter to be interrupted.

After switching on the machine, the system must be tested by reaching into the protective field. After pressing the "Start" pushbutton while the protective field is free and after reaching into and withdrawing from the field for one time, the contacts between output terminals 16-17 and 20-21 must close.

The monitoring circuit 6-7 effects an additional check of the state of the hydraulic valves or contactors that initiate the hazardous movement. The initiation of a new working stroke or movement is only possible if during a penetration of the protective field results both contactors or valves Kc1 and Kc2 have dropped and if then the protective field is free again.

The output 18 - 19 serves as a monitoring path. It must not be used as a contact to initiate the hazardous press-closing movement.

The "Start pushbutton" connection (Terminals D - 22), the "Counter reset circuit" contacts (Terminals 10 - 11) and the normally-closed contactor-monitoring contacts(Terminals 6-7) are for switching low voltages at low current rates. The contacts must be considered as floating contacts and be dimensioned accordingly (preferably twin contacts).