

## THT Schaltersysteme

## THT Switch Series

Die MENTOR-Schalterserie entspricht in ihrer Konzeption den seit Jahrzehnten bekannten und durch millionenfachen Einsatz in der Industrielektronik bewährten Ausführungen. Sie wurden im Hinblick auf die speziellen Bedürfnisse der THT-Technologie entwickelt. Taster und Schalter nehmen im Bereich der Frontplatten-Einbauelemente einen wesentlichen Raum ein. Es gibt vielfältige Ausführungen je nach Anwendungszwecken. Eine prinzipielle Unterscheidung ergibt sich aus der Art der Betätigung: Kiphebelbetätigung, Drücken, Drehen, Schieben. Es werden Schalter als 1- und 2-polige Ausführungen auch mit Umschaltfunktionen angeboten. Für spezielle Anwendungen werden sogenannte Kurzhubtasten eingesetzt.

Bei den mit FEL gekennzeichneten Bauteilen handelt es sich um Frontplatten-Einbauelemente, die für das 19"-Aufbausystem entwickelt wurden. Das System baut auf einem Grundrastermaß von 2,54 mm auf. Die Gehäuse sind mit seitlichen Stegen und Nuten versehen, die beim Anreihen ineinander greifen. Bei Bedarf sind Möglichkeiten zur Stapelung gegeben. Weitere FEL Produkte, z. B. LED-Bausteine finden Sie in unserem OPTO-Katalog.

The MENTOR switch series use the same concept as the types that have been used for decades and tried and tested a million times in industrial electronics. They are developed to meet the special requirements of THT-technology. Push buttons and switches play an important part in the area of front panel components. There is a variety of types for specific applications. A fundamental differentiation results from the way of operating those components: tipping toggle switches, pressing, rotating, sliding. Switches are offered as 1- and 2-pole versions including a shifting function. So called short lift buttons are used for specific purposes.

The switch series described as FEL are front panel assembly elements that have been developed for the 19-inch structure system. The system is based on a basic grid size of 2.54 mm. The casings are provided with guide rails and grooves that intersect with each other when connecting. Opportunities for stacking exist if required. Further FEL products, e.g. LED modules can be found in our OPTO catalog.



| Allgemeine Technische Daten (Auswahl bzw. Abweichungen zu den folgenden allgem. Daten: siehe Beschreibung des jeweiligen Artikels) |   | General Technical Data (Selection and deviations from the following general data: see description of the respective item) |  |
|--|---|---|--|
| Befestigungselemente   | Fixierpins und Frontplattenbohrung          | Fixing elements   | Fixing pin and front panel hole            |
| Lötbarkeit   | DIN EN 60068-2-20 (260 °C < 5s)             | Solderability   | DIN EN 60068-2-20 (260 °C < 5s)            |
| Betriebstemperatur   | -40 °C ... +85 °C                           | Operating temperature   | -40 °C ... +85 °C                          |
| Klima  | GPF DIN 40040                               | Climate   | GPF DIN 40040                              |
| Anschlüsse   | verzinkt                                    | Terminals   | Tinned                                     |
| Beschriftung   | je nach Ausführung Bedruckung oder gelasert | Marking   | Depending on type printed or laser printed |
| Verpackung   | Beutel oder Stangenmagazine                 | Packaging   | Bag or stick                               |
| Gehäusewerkstoff   | PC UL94 schwarz                             | Housing material  | PC UL94 black                              |

| Technische Details                                       |                                  | Technical Details                                     |                            |
|--|----------------------------------|---|----------------------------|
| Schaltspannung   | ≤ 60 V ≅                         | Operating voltage                                     | ≤ 60 V ≅                   |
| Schaltstrom  | ≤ 0.5 A                          | Operating current                                     | ≤ 0.5 A                    |
| Ruhestrom  | ≤ 2 A                            | Zero signal current                                   | ≤ 2 A                      |
| Schaltleistung   | ≤ 6 VA                           | Contact rating  | ≤ 6 VA                     |
| Prüfspannung   | 500 V / 50 Hz                    | Test voltage  | 500 V / 50 Hz              |
| Durchgangswiderstand                                     | < 30 mΩ                          | Volume resistance                                     | < 30 mΩ                    |
| Isolationswiderstand                                     | > 10 <sup>10</sup> Ω             | Insulation resistance                                 | > 10 <sup>10</sup> Ω       |
| Lebensdauer  | 2 x 10 <sup>4</sup> Schaltspiele | Life time   | 2 x 10 <sup>4</sup> cycles |
| ESD-fest gegen Front                                     | < 8 kV                           | ESD to front  | < 8 kV                     |
| Schutzart  | IP 50 DIN 40050                  | Degree of protection                                  | IP 50 DIN 40050            |
| Mindestbestellmengen für Sonderausführungen auf Anfrage. |                                  | Minimum order quantity for special design on request. |                            |

# Drucktaster

# Push-Button Switches

| Allgemeine Hinweise und Technische Daten                 | General Remarks and Technical Data              |
|--|---|
| Allgemeine Hinweise und technische Daten: siehe Seite 16 | General remarks and technical data: see page 16 |
| Technische Daten LEDs: Seite 42                          | Technical Data LEDs: page 42                    |

| Spezifische Technische Daten       | Specific Technical Data          |
|------------------------------------|----------------------------------|
| Betätigungskraft: max. 4 N         | Operating force: max. 4 N        |
| Gehäusewerkstoff: PPA schwarz UL94 | Housing material: PPA black UL94 |

Zur mechanischen Stabilisierung des Drucktasters ist neben Nut, Feder und Gehäuseträger ein Fixierpin vorgesehen. Die Bauelemente sind als Impulstaster ausgelegt. Die Drucktaster der Serie 1840 sind in 1-poliger und 2-poliger Version einsetzbar. Auf Wunsch sind verschiedenfarbige Bedientöpfe erhältlich (siehe Seite 25).

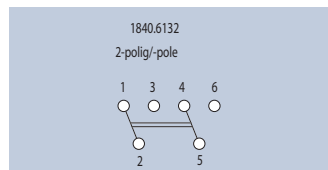
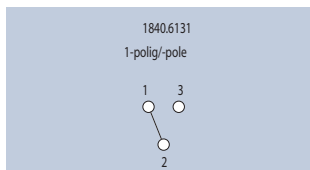
A groove, a spring and a collar as well as a fixing pin are used for mechanical stabilization of the push-buttons. The components are designed as impulse-buttons. Push-buttons of the 1840 series can be employed in a 1- and 2-pole version. The control switches are available in various colors on request (see page 25).

FEL  
THT

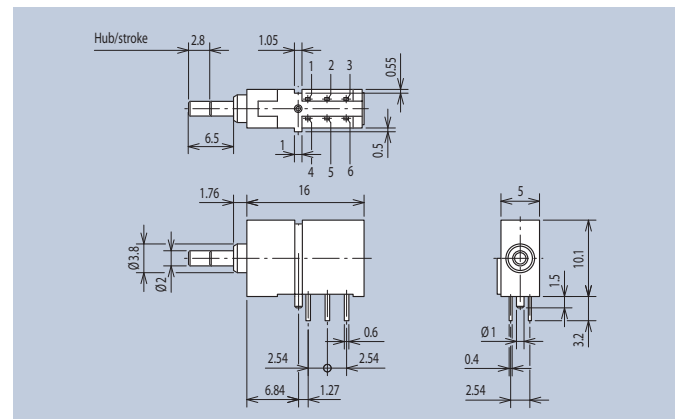


MOQ 50

| Funktion R-T · Function R-T |           |
|-----------------------------|-----------|
| Ausführung · Version        | Art.-Nr.  |
| 1-polig · 1 pole            | 1840.6131 |
| 2-polig · 2 pole            | 1840.6132 |



Schaltbild · Wiring Diagram



| Spezifische Technische Daten   | Specific Technical Data     |
|--------------------------------|-----------------------------|
| Durchgangswiderstand: < 200 mΩ | Volume resistance: < 200 mΩ |
| Betätigungskraft: max. 5 N     | Operating force: max. 5 N   |

Diese einpoligen Drucktaster sind als Impulstaster/Kurzhubtaster ausgelegt. Durch die Schnappscheibe aus CrNi-Stahl wird ein Kurzhub und eine sehr hohe Lebensdauer erreicht. Die taktile Rückmeldung definiert den Schaltpunkt. Die Tastenschalter der Serie 1845 sind mit einer LED ausgestattet, sodass der entsprechende Betätigungszustand angezeigt werden kann. Auf Wunsch sind verschiedenfarbige Bedientöpfe erhältlich (siehe Seite 25).

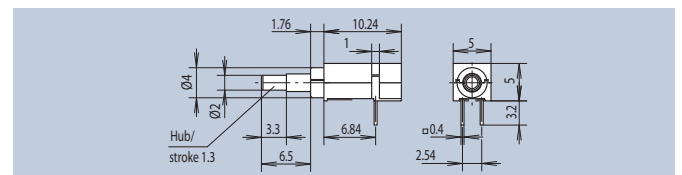
These 1-pole push-buttons are designed as impulse-buttons/short-stroke buttons. A short stroke and a very long lifetime are achieved through the snap disc made of CrNi-steel. The contact acknowledgement determines the switching point. The series 1845 switch buttons are equipped with a LED to indicate the particular operation status. Varicolored operation buttons are available on request (see page 25).

FEL  
THT

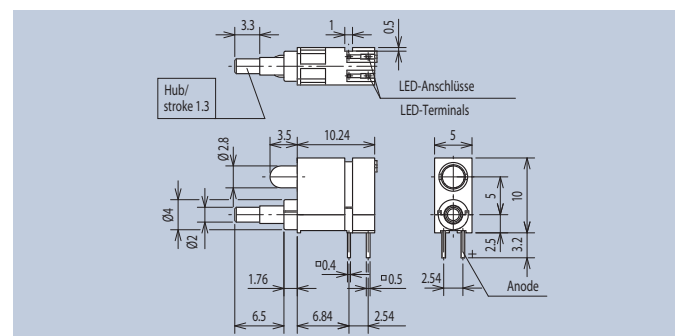


MOQ 1) 50  
2) 500  
3) 400

| Farbe · Color                                | LED-Type | Art.-Nr.                |
|--|----------|-------------------------|
| -  | -        | 1846.6031 <sup>1)</sup> |
| high efficiency red                          | A2       | 1845.6031 <sup>2)</sup> |
| red  | A1       | 1845.6032 <sup>1)</sup> |
| yellow                                       | A3       | 1845.6037 <sup>1)</sup> |
| green  | A4       | 1845.6038 <sup>1)</sup> |
| Low Current Ausführung · Low Current Version |          |                         |
| Farbe · Color                                | LED-Type | Art.-Nr.                |
| high efficiency red                          | A9       | 1845.6332 <sup>1)</sup> |
| yellow                                       | A10      | 1845.6337 <sup>3)</sup> |
| green  | A11      | 1845.6338 <sup>3)</sup> |



Ausführung 1846... · Version 1846...



Ausführung 1845... · Version 1845...

# Technische Daten LEDs

# Technical Data LEDs

| LED-Type | Emission Color                | Wavelength<br>$\lambda$ (nm)<br>dominant | Lense Color        | Forward Voltage<br>$V_F$ (V) |            | Luminous Intensity<br>$I_v$ (mcd) |       |          | at<br>mA | Fwd. Current<br>$I_F$<br>max (mA) | Rev. Voltage<br>$V_R$<br>(V) | $2\theta$<br>(50% $I_v$ )<br>deg. |
|----------|-------------------------------|--|--------------------|------------------------------|------------|-----------------------------------|-------|----------|----------|-----------------------------------|------------------------------|-----------------------------------|
|          |                               |  |                    | typ                          | max        | min                               | typ   | max      |          |                                   |                              |                                   |
| THT      |                               |  |                    |                              |            |                                   |       |          |          |                                   |                              |                                   |
| A2       | high efficiency red           | 625                                      | red diffused       | 2                            | 2.5        | 15                                | -     | 30       | 10<br>20 | 30                                | 5                            | 60                                |
| A3       | yellow                        | 588                                      | yellow diffused    | 2.1                          | 2.5        | 10                                | -     | 20       | 10<br>20 | 30                                | 5                            | 60                                |
| A4       | green                         | 568                                      | green diffused     | 2.2                          | 2.5        | 10                                | -     | 20       | 10<br>20 | 25                                | 5                            | 40                                |
| A6       | high efficiency red           | 625                                      | red diffused       | 2                            | 2.5        | 30                                | -     | 80       | 10<br>20 | 30                                | 5                            | 60                                |
| A7       | yellow                        | 588                                      | yellow diffused    | 2.1                          | 2.5        | 15                                | -     | 30       | 10<br>20 | 30                                | 5                            | 60                                |
| A8       | green                         | 568                                      | green diffused     | 2.2                          | 2.5        | 15                                | -     | 30       | 10<br>20 | 25                                | 5                            | 60                                |
| A9       | high efficiency red           | 625                                      | red diffused       | 1.7                          | 2.5        | 1.2                               | -     | 10       | 2        | 30                                | 5                            | 60                                |
| A10      | yellow                        | 588                                      | yellow diffused    | 1.85                         | 2.5        | 2                                 | -     | 6        | 2        | 30                                | 5                            | 60                                |
| A11      | green                         | 568                                      | green diffused     | 1.9                          | 2.5        | 1                                 | -     | 5        | 2        | 25                                | 5                            | 60                                |
| A12      | high efficiency red           | 625                                      | red diffused       | 2                            | 2.5        | 4                                 | -     | 10       | 2<br>20  | 30                                | 5                            | 60                                |
| A13      | yellow                        | 588                                      | yellow diffused    | 1.85                         | 2.5        | 1                                 | -     | 5        | 2        | 30                                | 5                            | 60                                |
| A14      | green                         | 568                                      | green diffused     | 2.2                          | 2.5        | 1                                 | -     | 5        | 2<br>20  | 25                                | 5                            | 60                                |
| A23      | yellow                        | 588                                      | yellow diffused    | 2.1                          | 2.5        | 5                                 | -     | 17       | 10<br>20 | 30                                | 5                            | 70                                |
| A24      | green                         | 568                                      | green diffused     | 2.2                          | 2.5        | 5                                 | -     | 17       | 10<br>20 | 25                                | 5                            | 70                                |
| A25      | bright red                    | 660                                      | red diffused       | 2.25                         | 2.5        | 1.2                               | -     | 6        | 10<br>20 | 25                                | 5                            | 60                                |
| A27      | yellow                        | 588                                      | yellow diffused    | 2.1                          | 2.5        | 6                                 | -     | 20       | 10<br>20 | 30                                | 5                            | 60                                |
| A28      | green                         | 568                                      | green diffused     | 2.2                          | 2.5        | 6                                 | -     | 20       | 10<br>20 | 25                                | 5                            | 60                                |
| A29      | high efficiency red           | 625                                      | red diffused       | 2                            | 2.5        | 70                                | -     | 220      | 20       | 30                                | 5                            | 60                                |
| A30      | yellow                        | 588                                      | yellow diffused    | 2.1                          | 2.5        | 36                                | -     | 90       | 20       | 30                                | 5                            | 60                                |
| A32      | high efficiency red           | 625                                      | red diffused       | 2                            | 2.5        | 36                                | 100   | -        | 20       | 30                                | 5                            | 60                                |
| A33      | yellow                        | 588                                      | yellow diffused    | 2.1                          | 2.5        | 20                                | -     | 50       | 20       | 30                                | 5                            | 60                                |
| A34      | green                         | 568                                      | green diffused     | 2.2                          | 2.5        | 40                                | -     | 60       | 20       | 25                                | 5                            | 60                                |
| A40      | yellow                        | 588                                      | yellow diffused    | 2.1                          | 2.5        | 3                                 | -     | 12       | 10<br>20 | 30                                | 5                            | 100                               |
| A41      | green                         | 568                                      | green diffused     | 2.2                          | 2.5        | 3                                 | -     | 12       | 10<br>20 | 25                                | 5                            | 100                               |
| A42      | bright red                    | 660                                      | red diffused       | 2.25                         | 2.5        | 1                                 | -     | 5        | 10<br>20 | 25                                | 5                            | 100                               |
| A44      | yellow                        | 588                                      | yellow diffused    | 2.1                          | 2.5        | 3                                 | -     | 12       | 10<br>20 | 30                                | 5                            | 100                               |
| A45      | green                         | 568                                      | green diffused     | 2.2                          | 2.5        | 1                                 | -     | 5        | 10<br>20 | 25                                | 5                            | 100                               |
| A46      | high efficiency red           | 625                                      | red diffused       | 2                            | 2.5        | 3                                 | -     | 7        | 10<br>20 | 30                                | 5                            | 110                               |
| A47      | yellow                        | 588                                      | yellow diffused    | 2.1                          | 2.5        | 1.8                               | -     | 7        | 10<br>20 | 30                                | 5                            | 110                               |
| A48      | green                         | 568                                      | green diffused     | 2.2                          | 2.5        | 2                                 | -     | 10       | 10<br>20 | 25                                | 5                            | 110                               |
| A49      | high efficiency red/<br>green | 617<br>568                               | white diffused     | 2<br>2.2                     | 2.5<br>2.5 | 8<br>8                            | -     | 20<br>40 | 20<br>20 | 30<br>25                          | -                            | 60<br>60                          |
| A51      | blue                          | 466                                      | blue transparent   | 3.8                          | 4.5        | 18                                | 100   | -        | 20       | 30                                | 5                            | 50                                |
| A52      | blue                          | 466                                      | blue transparent   | 3.8                          | 4.5        | 70                                | 200   | -        | 20       | 30                                | 5                            | 30                                |
| A60      | high efficiency red           | 625                                      | red diffused       | 5.7                          | 7.5        | 18                                | 61.56 | -        | 10       | 60                                | 15                           | 120                               |
| A61      | yellow                        | 588                                      | yellow diffused    | 5.85                         | 7.5        | 7                                 | 37.18 | -        | 10       | 60                                | 15                           | 120                               |
| A62      | green                         | 568                                      | green diffused     | 6                            | 7.5        | 18                                | 53.3  | -        | 10       | 50                                | 15                           | 120                               |
| A69      | super red                     | 622-634                                  | red diffused       | 2                            | 2.5        | 6.3                               | -     | 20       | 10       | 40                                | 12                           | 50                                |
| A70      | yellow                        | 580-595                                  | yellow diffused    | 2                            | 2.5        | 7.1                               | -     | 18       | 10       | 40                                | 12                           | 50                                |
| A71      | green                         | 564-576                                  | green diffused     | 2                            | 2.5        | 7.1                               | -     | 18       | 10       | 40                                | 12                           | 50                                |
| A72      | super red                     | 622-634                                  | red diffused       | 2                            | 2.5        | 7.1                               | -     | 18       | 10       | 40                                | 12                           | 70                                |
| A76      | high efficiency red/<br>green | 625<br>568                               | white diffused     | 2<br>2.2                     | 2.5<br>2.5 | 5<br>5                            | -     | 20<br>20 | 20<br>20 | 30<br>25                          | -                            | 70<br>70                          |
| A77      | super bright red              | 640                                      | red diffused       | 1.85                         | 2.5        | 280                               | 400   | -        | 20       | 30                                | 5                            | 60                                |
| A78      | yellow                        | 588                                      | yellow transparent | 2.1                          | 2.5        | 50                                | -     | 120      | 10<br>20 | 30                                | 5                            | 30                                |

## Technische Daten LEDs

## Technical Data LEDs

| LED-Type | Emission Color                | Wavelength<br>$\lambda$ (nm)<br>dominant | Lense Color        | Forward Voltage<br>$V_F$ (V) |            | Luminous Intensity<br>$I_v$ (mcd) |            |       | at<br>mA             | Fwd. Current<br>$I_F$<br>max<br>(mA) | Rev. Voltage<br>$V_R$<br>(V) | 2 $\theta$<br>(50 % $I_v$ )<br>deg. |
|----------|-------------------------------|--|--------------------|------------------------------|------------|-----------------------------------|------------|-------|----------------------|--------------------------------------|------------------------------|-------------------------------------|
|          |                               |  |                    | typ                          | max        | min                               | typ        | max   |                      |                                      |                              |                                     |
| THT      |                               |  |                    |                              |            |                                   |            |       |                      |                                      |                              |                                     |
| A79      | green                         | 568                                      | green transparent  | 2.2                          | 2.5        | 50                                | -          | 120   | 10<br>20             | 25                                   | 5                            | 30                                  |
| A83      | high efficiency red           | 625                                      | red transparent    | 2                            | 2.5        | 30                                | -          | 80    | 10<br>20             | 30                                   | 5                            | 50                                  |
| A84      | yellow                        | 588                                      | yellow transparent | 2.1                          | 2.5        | 20                                | -          | 50    | 10<br>20             | 30                                   | 5                            | 50                                  |
| A85      | green                         | 568                                      | green transparent  | 2.1                          | 2.5        | 30                                | -          | 50    | 10<br>20             | 25                                   | 5                            | 50                                  |
| A86      | high efficiency red           | 625                                      | red diffused       | 2                            | 2.5        | 20                                | -          | 50    | 15                   | 150                                  | 5                            | 70                                  |
| A88      | high efficiency red           | 625                                      | red diffused       | 2                            | 2.5        | 6                                 | -          | 15    | 15                   | 160                                  | 5                            | 100                                 |
| A90      | green                         | 568                                      | green diffused     | 2.2                          | 2.5        | 120                               | -          | 200   | 20                   | 140                                  | 5                            | 30                                  |
| C5       | orange red/<br>green          | 612-625<br>552-575                       | white diffused     | 2<br>2.4                     | 3<br>3     | 1<br>1                            | 2.5<br>2.5 | -     | 10<br>20<br>10<br>20 | 30                                   | 6                            | 60                                  |
| C12      | red                           | 630                                      | red diffused       | 2                            | 3          | 4                                 | -          | 32    | 10<br>20             | 20                                   | 6                            | 40                                  |
| C13      | yellow                        | 581-594                                  | yellow diffused    | 2.4                          | 3          | 2.5                               | -          | 12.5  | 10<br>20             | 30                                   | 6                            | 40                                  |
| C14      | green                         | 562-575                                  | green diffused     | 2.4                          | 3          | 6.3                               | -          | 32    | 10<br>20             | 30                                   | 6                            | 40                                  |
| C15      | red                           | 612-625                                  | red diffused       | 2                            | 3          | 10                                | -          | 50    | 10<br>20             | 30                                   | 6                            | 60                                  |
| C16      | yellow                        | 581-594                                  | yellow diffused    | 2.4                          | 3          | 10                                | -          | 50    | 10<br>20             | 30                                   | 6                            | 60                                  |
| C17      | green                         | 562-575                                  | green diffused     | 2.4                          | 3          | 10                                | -          | 50    | 10<br>20             | 30                                   | 6                            | 60                                  |
| E3       | high efficiency red/<br>green | 625<br>568                               | white diffused     | 2<br>2.2                     | 2.5<br>2.5 | 10<br>10                          | 50<br>30   | -     | 20<br>20             | 30<br>25                             | 5<br>5                       | 60<br>60                            |
| G1       | bright red                    | 660                                      | red diffused       | 2.25                         | 2.5        | 0.4                               | -          | 3     | 20                   | 25                                   | 5                            | 40                                  |
| G2       | yellow                        | 588                                      | yellow diffused    | 2.1                          | 2.5        | 2.6                               | 10         | -     | 20                   | 30                                   | 5                            | 40                                  |
| G3       | super bright green            | 568                                      | green diffused     | 2.2                          | 2.5        | 2.6                               | 10         | -     | 20                   | 25                                   | 5                            | 40                                  |
| H1       | super deep red                | 639                                      | red diffused       | 2                            | 2.4        | 40                                | 80         | -     | 20                   | 25                                   | 5                            | 100                                 |
| H2       | super yellow                  | 589                                      | yellow diffused    | 2                            | 2.4        | 25                                | 50         | -     | 20                   | 25                                   | 5                            | 100                                 |
| H3       | super yellow green            | 573                                      | green diffused     | 2                            | 2.4        | 6.3                               | 12.5       | -     | 20                   | 25                                   | 5                            | 60                                  |
| H4       | hyper red                     | 624                                      | red diffused       | 2                            | 2.4        | 10                                | 20         | -     | 20                   | 25                                   | 5                            | 100                                 |
| M2       | white                         | -  | colorless clear    | 3.6                          | 4          | 3900                              | -          | 11000 | 20                   | 30                                   | 5                            | 20                                  |
| W1       | white                         | -  | colorless clear    | 3.2                          | 3.8        | 1400                              | -          | 3550  | 5                    | 25                                   | 5                            | 45                                  |
| Argus    |                               |  |                    |                              |            |                                   |            |       |                      |                                      |                              |                                     |
| A15      | super red                     | 628                                      | red clear          | 2.1                          | 2.5        | 35.5                              | -          | 71    | 15                   | 40                                   | 12                           |                                     |


## Symbole

## Symbols


### Besonderheiten · Specifics


 Produktneuheit  
New product

 Sehr hoher ESD-Schutz zur Frontplatte bzw. Gehäusefront.  
Very high level of ESD protection for the front panel.

 Frontplatten-Einbauelemente zur Nutzung als Anzeigeelemente für das 19"-Aufbausystem.  
Front panel assembly elements for use as display elements for the 19-inch structure system.

### Kundenspezifisch · Customised

 Kundenspezifische Ausführung möglich.  
Customised solutions available.

 Lagermäßig geführte Artikel (Art.-Nr. in **Fettdruck**) liefern wir mit geringen Mindestbestellmengen und kurzen Lieferzeiten.  
Parts, that are available ex-stock (Part No. in **bold**) are delivered with small MOQs and short delivery times.

 Mindestbestellmenge für Nicht-Lagerhaltige-Artikel (Art.-Nr. in Magerdruck). Lieferzeit auf Anfrage.  
Minimum quantity for manufacture of non-stocked part nos. (in normal font): delivery time on request.

 Mindestbestellmenge für Sonderlängen (Länge A). Lieferzeiten und andere Sonderversionen auf Anfrage.  
Minimum quantity for customer defined "Length A": delivery times and other customisation on request.