KOLLMORGEN

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# High frequency inverter
# by ACOMEL

# *TL5 Programming Terminal*
# *USER MANUAL*

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Solutions by DANAHER MOTION

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# *Table of content*



**This manual is valid from:**

1. **Firmware version 1.50 or above of the ACO5000**
2. **Firmware version 1.07 of the TL5**

## *Starting the terminal TL5*

### Where to connect


Use a 1 to 1 standard serial cable.

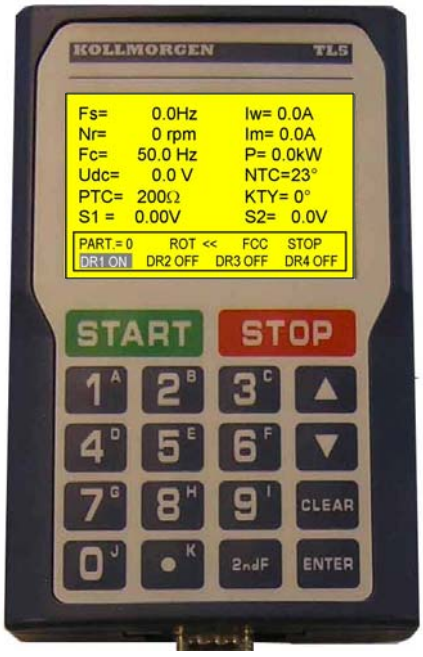
Connect the TL5 to the connector KEYPAD of the power supply module.

For multi-axis configuration, the TL5 can address the various drives.

The connexions between the drives are made internally.

The TL5 can be connected before or after to have turned ON the drive.

### Keypad description




The DISPLAY, 8 lines of 21 characters', shows:

- The selected drive values using the 6 first lines
- The drive status (permanent) use the last 2 lines
  - The active drive "DR1 ON "
  - The unactive drive(s) "DR2 OFF"
  - The direction of rotation "ROT <<", "ROT >>"
  - Various status "FCC", "FCP", "DEC", "FREQ↘"
  - The drive status "STOP", "START", "FAULT"

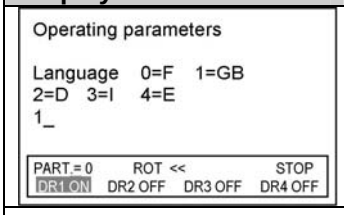
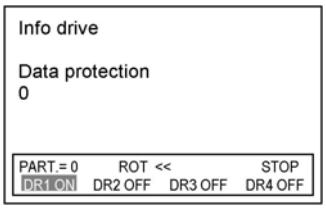
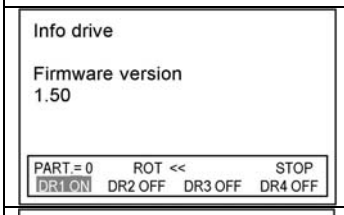
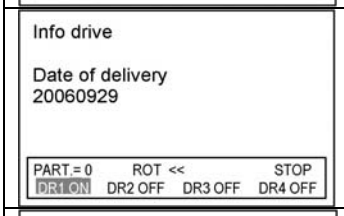
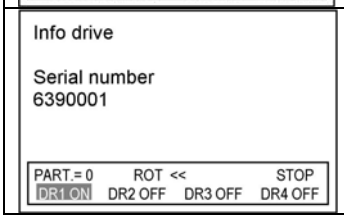
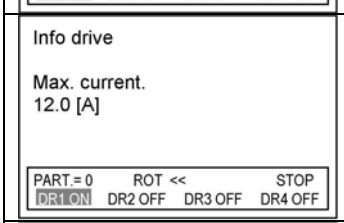
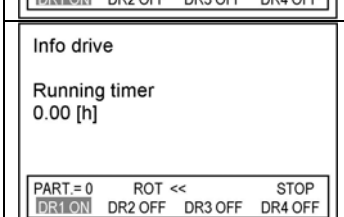
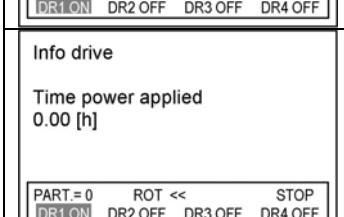
The KEYS:

- START and STOP
- The 10 numerical keys 0 to 9
- The numerical dot
- The 11 corresponding alphabetical keys activated through pressing first the 2ndF key.
- The arrows up down to navigate within the selected menu.
- The CLEAR key to delete the inputed value
- The ENTER key to cofirm the input

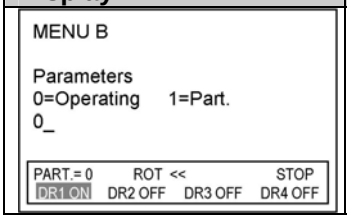
### Function key 2ndF

Pressing this key followed by one of the other will give you access to the menu corresponding to the letter of the second key. For example pressing **2ndF** followed by **A** (key 1) give you access to the menu A. That is where you have to start.

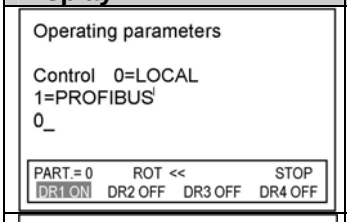
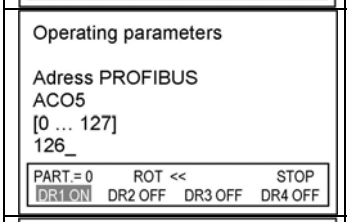
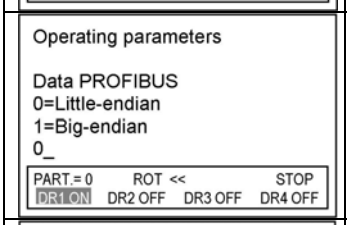
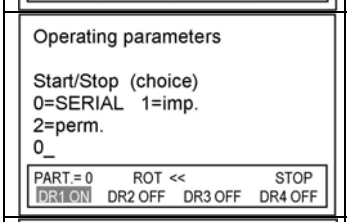
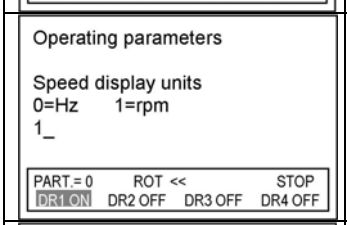
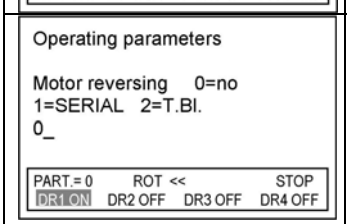
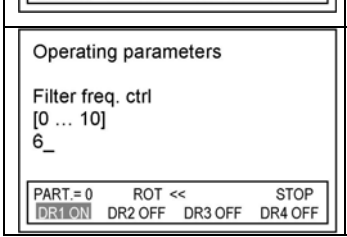
### Menu A: the drive information

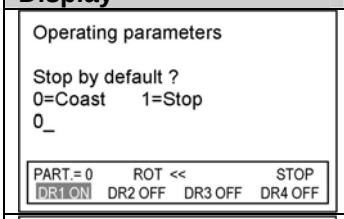
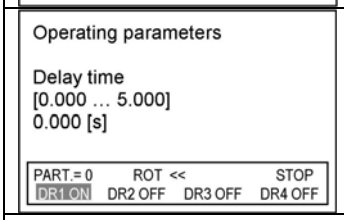
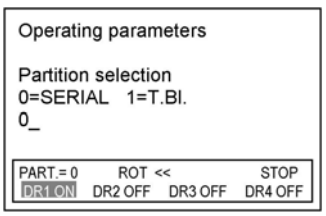
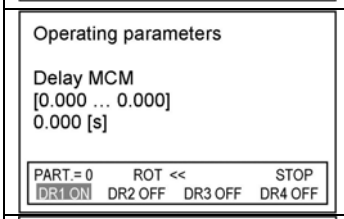
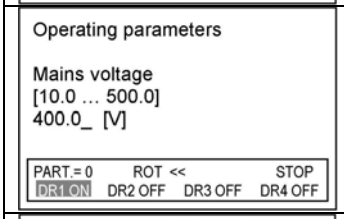
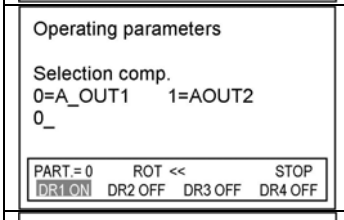
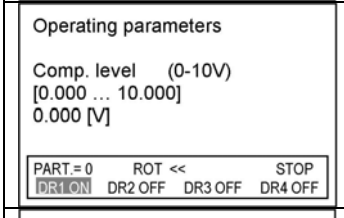
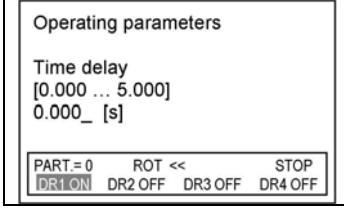
| Display | Description | Values |
|---|---|---|
|  | Select your language by entering the corresponding number and pressing ENTER | |
|  | This is a read only information. It tells you if you can access to the partition data.<br>0 = free access<br>1 = access locked by password. It is not possible to change this setting using the TL5. To do it you need to connect a PC, use the programming Window's software and to know the password set by your machine supplier | |
|  | Release number of the installed software.<br>In case of programming problems, please indicate this number when calling our customer support.<br>The TL5 need the version 1.50 or later | **x.xx** |
|  | Shipping date of the unit. This is the date the unit left our manufacturing plant in Switzerland. | **yyyymmdd** |
|  | Specific to each unit. Format yy (year) followed by ww (week) and nnnn (incremental number during the week. **Note:** until year 2010, the year will have only one digit. | **yywwnnnn** |
|  | Display the maximum output current of the inverter. This parameter is related to the drive rating and is used to protect the drive in overload conditions as well short circuit between phases and phase to ground. | **ACO5005D : 7.5 A**<br>**ACO5008D : 12 A**<br>**ACO5012D : 18 A**<br>**ACO5020D : 30 A** |
|  | Cumulated time in START mode | **0.00 [H]** |
|  | Cumulated time input voltage ON | **0.00 [H]** |

**Menu B**

| Display | Description |
|---|---|
|  | The menu B is divided into two sections:<br>• The operating parameters i.e. how the drive is communicating with the machine and how it is operated.<br>• The partition parameters, i.e. the specific data of the motor. The partition section can be repeated 32 times. |

**Menu B: Operating parameters**

| Display | Description |
|---|---|
|  | Selection of the control mode of the drive.<br>• **LOCAL** means you can operate the drive either through the terminal bloc, the remote keypad or the connected PC.<br>• **PROFIBUS** allocated the full control to the field bus. No control or data change via the TL5 is possible. |
|  | To set the PROFIBUS address of the drive.<br>This value depends from your Profibus configuration.<br>For further information see our specific Profibus user manual. |
|  | Configuration of the Profibus data.<br>This value depends from your Profibus configuration.<br>For further information see our specific Profibus user manual. |
|  | Function can be assigned to:<br>• **SERIAL** means to USB port or TL5 dedicated keypad<br>• **imp** means impulse signal to START and STOP terminals<br>• **perm** means permanent contact to START terminal.<br>By **SERIAL** or **perm.** selection, a permanent 24 VDC signal must be applied to the STOP terminal. |
|  | Here you pre-set the displayed units for the speed i.e. Hz or RPM.<br>The number of poles of the motor will be taken into consideration automatically. |
|  | If you want to lock any reversing of the rotating direction of the motor you can do it here by entering **no**.<br><br>If you allow the reversing, the function can be assigned to:<br>• **SERIAL** means to USB port or TL5 dedicated keypad<br>• **T.BI.** means to Control terminals in the drive front. One digital input must be allocated to the function. |
|  | Input here a filter value for the analog speed reference input.<br>This factor is needed to smooth speed variations due to signal noise.<br>Value **0** to **10** |

| Display | Description |
|---|---|
|  | For all non-destructive failures where the STOP can be monitored, like: Converter temperature, External Interlocks, …. We can choose between 2 ways of stopping the motor:<br>• Coast to rest<br>• Braking down using the deceleration's ramp |
|  | For all non-destructive failure where the turn off can be delayed, like Converter temperature, External Interlocks, Motor temperature, … a delay time of 0 to 5 s can be input here.<br>This function is to allow the CNC to monitor the machine motion before the converter trips. |
|  | At this step you decide the way you want to select the active partition Function can be assigned to:<br>• **SERIAL** means to USB port or TL5 dedicated keypad<br>• **T.BI.** means to Control terminals in the drive front.<br>The required number of programmable digital inputs must be allocated to this selection.<br>***NOTE*:**The partition No 0 is **not** available by T.BI. |
|  | Internal timer which can be set from 0 to 5 s. This is a delay between the frequency (speed) reached information and the enable of the MCM function in order to let time to the rotor speed to stabilize. |
|  | Enter here the nominal value in V, of the voltage of your power supply. Input value between 10 and 500 V.<br><br>All input mains voltages between 170 VAC and 530 VAC are considered being inside of the drive tolerances. |
|  | A value allocated to one of the A_OUT1 or A_OUT2 can be internally compared to a define voltage level (0 to 10 VDC) set in the next step. Once this level is reached or exceeded an alarm can be triggered after a set delay time. |
|  | Definition of the comparison level. Set a value between 0 and 10 VDC |
|  | Time delay to trigger the alarm once the comparison level above has been reached or exceeded. This function must be allocated to one of the digital outputs OUT1 to OUT4. |

| Display | Description |
|---|---|
| Operating parameters<br><br>Chopper frequency<br>0=HIGH 1=LOW<br>0_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | To set the operating frequency of the intermediate DC-bus chopper. For standard application, always use "HIGH". If the ambient temperature is high, or if you experience repeated drive failure with the message "Converter temperature too high", set this frequency to "LOW". |

**Menu B: Partition parameters**

| Display | Description |
|---|---|
| Partition parameters<br><br>Password<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Here you need to ley in the password which will give you access to the partition parameters<br><br>The password is: **616** followed by **ENTER** |
| Partition parameters<br><br>Partition No<br>[0 … 31]<br>0_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Enter here the number of the partition you want to program.<br><br>Each partion contains all parameters related to the motor.<br><br>32 partitions are available in LOCAL mode, but only 31 in terminal block mode. |
| Partition parameters<br><br>No of poles<br>[2 … 1024]<br>2_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | This is the number of poles and not the number of pairs. It must be an even number. This value is shown on the motor plate and/or in the motor data sheet. Maximum number of poles: 2 - 1024 |
| Partition parameters<br><br>Motor power<br>[0.00 … 635.35]<br>0.00_ [kW]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Input here the power of the motor which will correspond to a 10 V signal when $P_W$ is allocated to the analog output A_OUT1 or A_OUT2 |
| Partition parameters<br><br>Motor nom. Current<br>(Inom)<br>[0.0 … 12.0]<br>0.0_ [A]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Value in A. This input is use to check the setting of current related parameters as follow:<br>• **$I_{REF}$** ≤ 150% of $I_{NOM}$ (motor reference current)<br>• **IFCC** ≤ 100% of $I_{NOM}$ (DC current braking)<br>• **IFCP** ≤ 20% of $I_{NOM}$ (DC continuous current braking)<br>• **IACC** ≤ 200% of $I_{NOM}$ (Acceleration current max.) |
| Partition parameters<br><br>Current accel/decel<br>(Iacc)<br>[0.0 … 12.0]<br>0.0_ [A]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Set here the maximum acceleration current.<br>Value over 200% of $I_{NOM}$ will be rejected.<br><br>The function **If $I_m > I_{REF}$:** is inhibited during acceleration and deceleration. |
| Partition parameters<br><br>Motor current (Iref)<br>[0.0 … 12.0]<br>0.0_ [A]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Set here the maximum allowed current during operation. The limit value is 150% of **$I_{NOM}$** . This value is used dor the comparison **$I_m > I_{REF}$** |

| Display | Description |
|---|---|
| Partition parameters<br><br>Freq ctrl source<br>0=SERIAL 1=T.BI.<br>0_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Frequency control source. At this step you can set if you want to assign the output frequency of the drive, respectively the motor speed to the:<br>• **SERIAL** means to USB port or TL5 dedicated keypad<br>• **T.BI.** i.e to the 0 to 10 V analog speed reference input A_IN in the drive front or one of the 3 possible preset frequencies. |
| Partition parameters<br><br>Default frequency<br>[50.00 … 5000.00]<br>50.00_ [Hz]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | In case of selection of a **SERIAL** selection of the **Freq. ctrl source**, the value entered or shown here will be taken as speed reference input when the inverter is being turned ON. In running mode you can record the actual value as default just by hitting the **2ndF J** keys. Here again, the input must be in Hz, input in RPM is not allowed and will lead to a mis-setting. |
| Partition parameters<br><br>Minimum frequency<br>[0.00 … 1000.00]<br>50.00_ [Hz]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Enter here the minimum frequency under which one you don't want to operate your motor. |
| Partition parameters<br><br>Preset frequency 1<br>[0.00 … 1000.00]<br>00.00_ [Hz]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | If you have selected the **Freq. ctrl source** from the **T.BI.** you have the possibility to define up to 3 pre-set speeds. The selection of one of those pre-set speeds will be done applying +24V to the allocated terminal(s). If this feature has been activated and no selection made through terminals, the analog reference input will be active. Here again, the input must be in Hz, input in RPM is not allowed and will lead to a wrong setting. |
| Partition parameters<br><br>Acceleration time<br>min.<br>[0.1 … 512.0]<br>10.00_ [s]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | The minimum **acceleration** time is set in seconds, between 0.1 to 512. This is the acceleration time needed to reach the full speed of the motor. If the set speed is the half of the full speed, the time to reach this speed will be the half of the acceleration set time. This value is a minimum and can't be reduced within the dynamic parameters. |
| Partition parameters<br><br>Deceleration time<br>min.<br>[0.1 … 512.0]<br>10.00_ [s]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | The minimum **deceleration** time is set in seconds, between 0.1 to 512. This is the deceleration time needed to reach zero speed from the full speed of the motor. If the set speed is the half of the full speed, the time to stop will be the half of the deceleration set time. This value is a minimum and can't be reduced within the dynamic parameters. |
| Partition parameters<br><br>Measure speed 0=no<br>1=encoder<br>2=MR-sensor<br>0_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | This is only a speed measurement and not a speed closed loop.<br>Our sensor input accepts:<br>• Standard 5 V TTL encoder signals, 2 channels 90° phase shifted, with or without index.<br>• Magneto-resistive sensor signal |
| Partition parameters<br><br>Nbre pulses/revol.<br>[0 … 65535]<br>0_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Enter here the number of pulses per revolution: Value: **0** to **65535** |
| Partition parameters<br><br>Measured speed<br>Filter<br>[0 … 10]<br>6_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | To stabilize the display of the speed you can here input a filter value. |

| Display | Description |
|---|---|
| Partition parameters<br><br>Reached speed window<br>[0 … 20000]<br>0_ [rpm]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Setting **0 rpm**, the signal "reached speed" will be delivered at the end of the acceleration when the speed is over 95% of the set value.<br><br>Setting an othe number of rpm will maintain the signal reached speed active so long the output speed remain in this window (positive or negative). |
| Partition parameters<br><br>Slip<br>[0 … 65535]<br>0_ [rpm]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Using the speed feedback is it possible to monitor the slip of the motor and issue a signal when the slip exceed a pre-set value.<br>Input of the maximum slip in RPM |
| Partition parameters<br><br>If Im>Iref 0=trip<br>1=dec. 2=ignore<br>2_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Set the reaction of the drive when the motor current $I_M > I_{REF}$<br>• **trip** you will trip the drive<br>• **dec** you will reduce the output frequency $\mathbf{F_S}$ to keep the motor current lower than the reference current<br>• **ignore** the information. In this case the maximum current of the inverter will be available for the motor.<br>The information that the current $\mathbf{I_m > I_{REF}}$ can be allocated to one of the digital outputs OUT1 to OUT4 |
| Partition parameters<br><br>Tempo. Im>Iref<br>[0.000 … 5.000]<br>0.100 [s]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | This is the delay to activate $\mathbf{I_m > I_{REF}}$ after the reach speed signal. This delay is used to wait that the speed has stabilized before $\mathbf{I_m > I_{REF}}$ is activated. |
| Partition parameters<br><br>RI- compensation<br>[0.0 … 30.0]<br>0.0_ [V]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | The resistance **R** of the motor winding is source of a voltage drop proportional to the motor current **I**. The **RI** voltage will be added to the output voltage $\mathbf{U_S}$ to obtain the nominal torque over the entire frequency range. This function is mainly used when operating at the lower part of the range. The value can be set between 0 and 30 V. |
| Partition parameters<br><br>Slip compensation<br>[0 … 3000]<br>0.0_ [rpm]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | The number of RPM entered here correspond to the slip compensation at motor nominal current $I_{NOM}$ |
| Partition parameters<br><br>Temperature<br>Measurement 0=PTC<br>1=KTY84-130<br>0_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | The temperature monitoring of your motor can be made, using a PTC or a KTY84-130. Please select here the temperature sensor integrated into your motor windings. |
| Partition parameters<br><br>Max temperature<br>(KTY)<br>[50 … 150]<br>130_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | If you have selected the KTY84-130, enter here the temperature value you want to monitor and trip or stop the drive. |

**The Nema input**

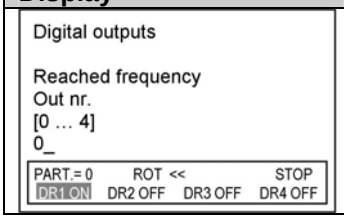
| Display | Description |
|---|---|
| Nema<br><br>Nema U(f) 0=Cancel<br>1=Mod 2=New<br>0_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Here you have 3 choices:<br>**0** if you want to cancel a Nema<br>**1** if you want to modify an existing one<br>**2** if you want to create a new one<br>You can define up to 4 points for the Nema. The origine one 0V/0Hz is automatically created. |
| Nema<br><br>Frequency #1<br>[1.00 … 5000.00]<br>1.00_ [Hz]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Enter here the frequency of the first point, followed by **ENTER** |
| Nema<br><br>Voltage #1<br>[1.00 … 400.00]<br>1.00_ [V]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Enter here the voltage of the first point, followed by **ENTER**<br><br>Once you have completed your Nema, you need to close and confirm it just by entering **2ndF B** |

**Menu C: the terminals allocation**

| Display | Description |
|---|---|
| Control term. block<br><br>Control term. Block<br>0=IN 1=OUT 2=SAN<br>0_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | First step decide which type of allocation you want to do:<br><br>**0** You want to allocate digital input(s) - 8 inputs available<br>**1** You want to allocate digital outputs(s) - 4 outputs available<br>**2** You want to allocate analogue output(s) - 2 outputs vailable |
| Digital inputs<br><br>ExtInt.<br>[0 … 8]<br>0_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Having selected **0**, you can allocate the first available function of the digital inputs.<br><br>If you key in “0”, the function is not allocated. |

**Menu C: the available functions for the digital inputs**

| Functions to allocate | **Comments on the allocated function** |
|---|---|
| **VerExt** | External interlock |
| **ISR** | Reverse rotating direction |
| **VerConsAn** | Inhibit the speed reference analogue input |
| **FreFix0** | Fix frequency value $2^0$ |
| **FreFix1** | Fix frequency value $2^1$ |
| **SelPart0** | Partition selection value $2^0$ |
| **SelPart1** | Partition selection value $2^1$ |
| **SelPart2** | Partition selection value $2^2$ |
| **SelPart3** | Partition selection value $2^4$ |
| **SelPart4** | Partition selection value $2^5$ |
| **NivMcm0** | MCM level value $2^0$ |
| **NivMcm1** | MCM level value $2^1$ |
| **SelMcm0** | MCM selection value $2^0$ |
| **SelMcm1** | MCM selection value $2^1$ |
| **SampleHoldMcm** | Active the Sample & Hold reading |

| Display | Description |
|---|---|
|  | Having selected **1**, you can allocate the first available function of the digital outputs.<br><br>If you key in “0”, the function is not allocated. |

**Menu C: the available functions for the digital outputs**

| Functions to allocate | Comments on the allocated function |
|---|---|
| **Reached frequency** | The allocated output will turn ON as soon the output frequency of the converter is higher than 95% of the set value and after the MCM delay if a value has been programmed. The MCM delay ca be monitored from the CNC or PLC too. |
| **Reached speed** | The allocated output will turn ON as soon the measured motor speed 95% of the set value and MCM tempo as above.<br>This function need a speed feedback from motor |
| **Zero frequency** | The allocated output will turn ON as soon the output frequency of the converter is under 0.5 Hz<br>**This function is only active in STOP mode** |
| **Zero speed** | The allocated output will turn ON as soon the measured output speed is lower than 2 pulses / sec..<br>This function is active only in STOP status |
| **Start/stop** | The allocated output will turn ON as soon the converter is in START mode |
| **Motor overload** | The allocated output will turn ON as soon the motor current is higher than the reference current: $\mathbf{I_m > I_{REF.}}$ This choice is only possible if the condition “Ignore” or "trip" has been programmed. |
| **MCM output** | The allocated output will turn ON as soon the **MCM** condition is true. |
| **Slip Output** | The allocated output will turn ON as soon as the **SLIP** is higher than the programmed value. Need a speed feedback. |
| **Alarm output** | The allocated output will turn ON as soon as an **alarm** has been triggered. This function is used in combination with the delayed trip by non destructive failure |
| **Comp. output** | The allocated output will turn ON, after the programmed delay, when the analog input exceed the programmed level. |
| **Signal SDIG** | Clock output corresponding to 6 time the output frequency |
| **Ext. interlocks** | The allocated output will turn ON as soon the external interlock circuitry is open. |
| **Converter overload** | The allocated output will turn ON if the output current exceeds the maximum current of the converter. This current value is shown in the **info drive** menu**.** |
| **Def. aux. supply** | In failure free status, the allocated output is powered ON |
| **Motor temp (PTC)** | The allocated output will turn ON if the motor temperature is to high |
| **Converter temp (NTC)** | The allocated output will turn ON if the heatsink temperature exceeds 70°C, tolerance ± 3°C.. |
| **Mains anomaly** | The mains voltage is compared to the value entered in the operating parameters allocated output will turn ON if the mains voltage is out of the tolerance of 480 V+10 % respectively 200 V –15%. |

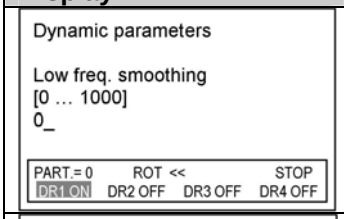
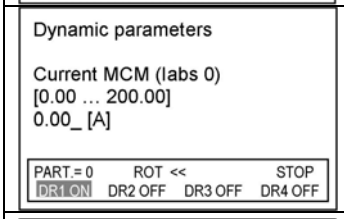
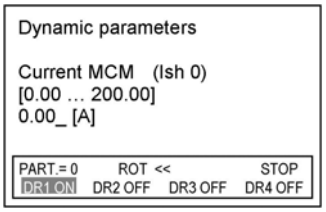
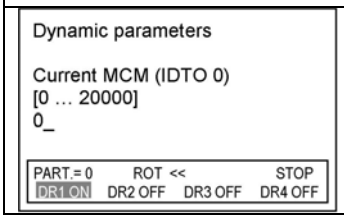
| Display | Description |
|---|---|
| Analog. outputs<br><br>Fs<br>[0 … 2]<br>0_<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Having selected **2**, you can allocate the first available function of the analogue outputs.<br><br>If you key in "0", the function is not allocated.<br>Two analogue outputs are available: 1 and 2 |

**Menu C: the available function for the analogue outputs**

- **Fs** for the output frequency: 10 V = $\mathbf{F_{max}}$
- **Im** for the motor current : 10 V = 1.5 * $\mathbf{I_{NOM}}$
- **N** speed of the motor 10 V = $\mathbf{N_{MAX}}$
  need a speed feedback from the motor
- **Pw** active output power 10 V = $\mathbf{P_{MAX}}$ of motor
- **Iw** active output current 10 V = $\mathbf{P_{MAX}}$ **/** 1.28 $\mathbf{U_S}$
- **Us** for output voltage: 10 V = last $\mathbf{U_S}$ **/**$\mathbf{F_S}$ **Pt.**

**Menu D: the dynamic parameters**

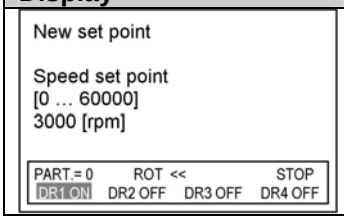
| Display | Description |
|---|---|
| Dynamic parameters<br><br>Acceleration time<br>[10.0 … 512.0]<br>10_ [s]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | The **acceleration** time is set in seconds, between 0.1 to 512.<br>This is the acceleration time needed to reach the full speed of the motor. If the set speed is the half of the full speed, the time to reach this speed will be the half of the acceleration set time.<br>This time must be ≥ as the minimum acceleration time set within the motor partition. |
| Dynamic parameters<br><br>Deceleration time<br>[10.0 … 512.0]<br>10_ [s]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | The **deceleration** time is set in seconds, between 0.1 to 512.<br>This is the deceleration time needed to reach zero speed from the full speed of the motor. If the set speed is the half of the full speed, the time to stop will be the half of the deceleration set time.<br>This time must be ≥ as the minimum deceleration time set within the motor partition. |
| Dynamic parameters<br><br>FCC current (IFCC)<br>[0.0 … 12.0]<br>0.0_ [A]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Value of the DC injected braking current. IFCC should not be higher than the nominal current of the motor.<br>This function, when activated, is automatically initiated after a STOP command, when the intermediate DC- bus reaches is ≤ 35 VDC. |
| Dynamic parameters<br><br>FCC duration<br>[0.000 … 60.000]<br>0.000_ [s]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | DC braking current duration |
| Dynamic parameters<br><br>Permanent current<br>(IFCP)<br>[0.0 … 2.2]<br>0.0_ [A]<br><br>PART.= 0 ROT << STOP<br>DR1 ON DR2 OFF DR3 OFF DR4 OFF | Value of the permanent injected DC braking current. This function is used when the motor needs to be braked (holding torque) at standstill, for example to keep air bearing spindle from rotating at stop. We suggest setting this current not higher than 20% of the motor nominal current. |

| Display | Description |
|---|---|
|  | Low frequency smoothing factor, to be used only in case of unstability at low frequencies. |
|  | Set here the absolute reference value to which the motor current must be compared to trigger the allocated output. This value is in A.<br>For one partition, 4 values can be entered. |
|  | The value to set here is the sensitivity of the SH monitoring. The value set is the current increase (A) versus the recorded one, which will trigger the corresponding output.<br>At the releasing of the allocated digital input, the instant value of $I_m$ is recorded. As soon the motor current exceed "***the recorded $I_m$ + $I_{SH}$***", the allocated output will be triggered.<br>For one partition, 4 values can be entered. |
|  | Enter here the dynamic sensitivity factor, value between 0 to 20 000. Higher is the factor, lower is the sensitivity. The allocated output will turn ON for approximately 200 ms.<br>For one partition, 4 values can be entered. |

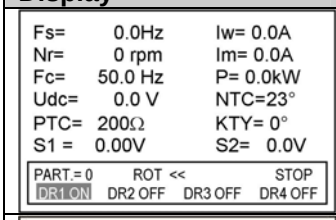
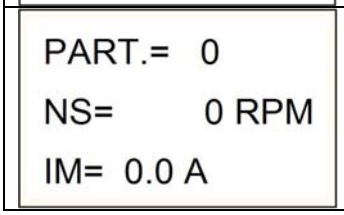
**Menu E: reversing the rotation**

With the sequence **2ndF E** you can reverse the direction of rotation of the motor. This instruction is only possible when the reversing of the rotation has been allowed within the operating parameters of the menu B, and the reversing allocated to the **SERIAL** operation.

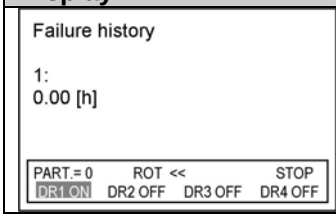
**Menu F: setting a new set point**

| Display | Description |
|---|---|
|  | Set a new speed. The input can be in Hz or rpm depending of the choice of the speed display within the operating parameters of the menu B. |

**Menu G: displaying the actual values**

| Display | Description |
|---|---|
|  | Here the display when all values are shown. |
|  | Here the "zoomed" display when selected. |

**Menu H: The failure history**

| Display | Description |
|---|---|
|  | With the sequence **2ndF H** you can display the failure history. The first failure shown is the last happening. The last 8 failures are recorded.<br><br>The failure is displayed with a time information related to the time “power applied” – see Menu A |

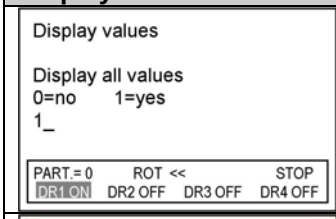
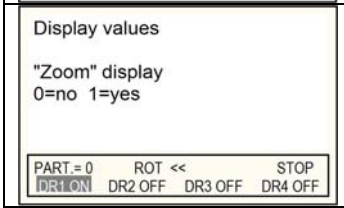
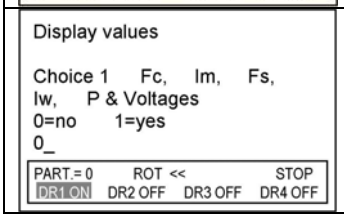
**Menu I: RESET**

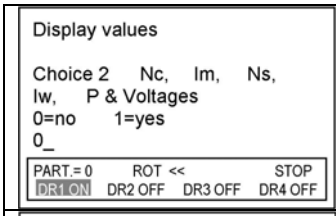
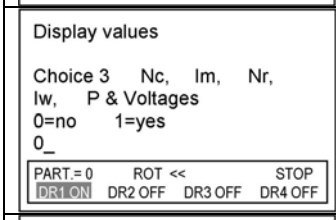
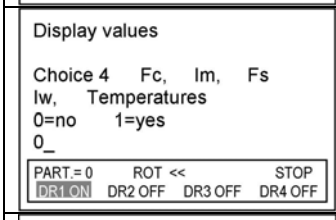
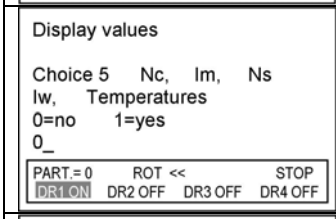
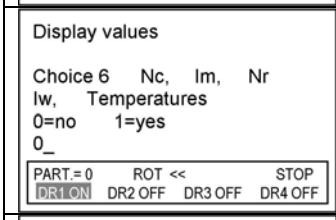
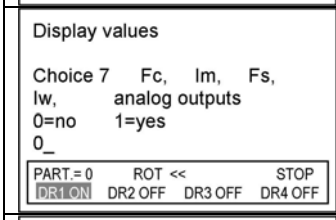
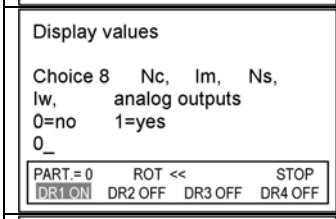
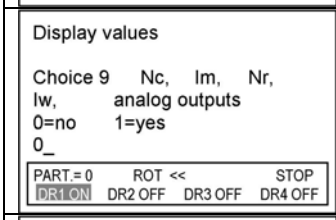
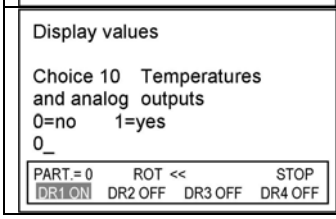
With the sequence **2ndF I** you can **RESET** the drive after a failure.

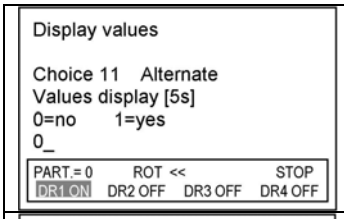
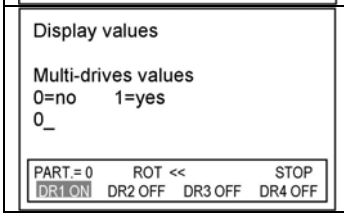
**Menu J: save the actual speed set point as default**

With the sequence **2ndF I** you can save the actual set point as default value within the menu B.

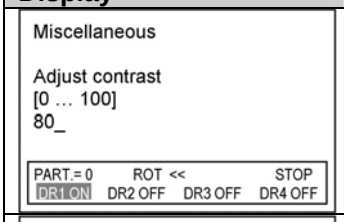
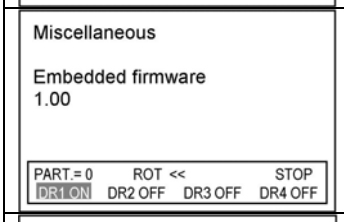
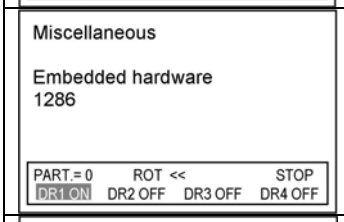
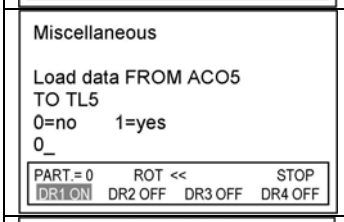
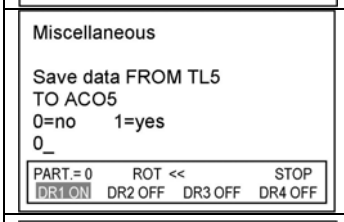
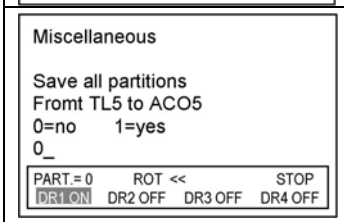
**Menu K: setting the display**

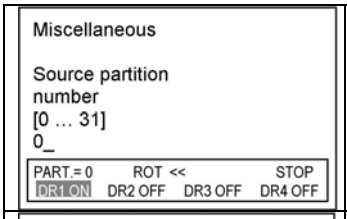
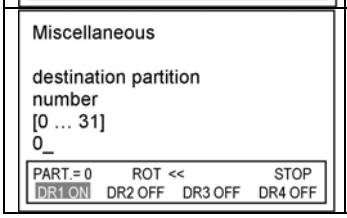
| Display | Description |
|---|---|
|  | With the sequence **2ndF K** you can select the values shown on the display.<br>**0** to move to the next choice<br>**1** displays all values as shown with 2ndF G above |
|  | "Zoom" display enhances the character size of the "actual values" display (See menu G). This display is only valid when only one ACO5xxx is connected and is also automatically set back to the standard display when more than one ACO5xxx are online.<br>**0** to move to the next choice<br>**1** to activate |
|  | **Selection 1** – Speed display is set in Hz<br>Fc = frequency set point, Im = motor current, Fs = output frequency<br>Iw = active current, P&Voltages = power and voltages<br><br>**0** to move to the next choice<br>**1** to activate |

| | |
|---|---|
|  | **Selection 2** – Speed display is set in rpm<br>Nc = speed set point, Im = motor current, Ns = output speed<br>Iw = active current, P&Voltages = power and voltages<br><br>**0** to move to the next choice<br>**1** to activate |
|  | **Selection 3** – Speed display in rpm and speed feedback<br>Nc = speed set point, Im = motor current, Nr = measured speed<br>Iw = active current, P&Voltages = power and voltages<br><br>**0** to move to the next choice<br>**1** to activate |
|  | **Selection 4**<br>As selection 1, but temperatures instead of power and voltage.<br><br>**0** to move to the next choice<br>**1** to activate |
|  | **Selection 5**<br>As selection 2, but temperatures instead of power and voltage.<br><br>**0** to move to the next choice<br>**1** to activate |
|  | **Selection 6**<br>As selection 3, but temperatures instead of power and voltage.<br><br>**0** to move to the next choice<br>**1** to activate |
|  | **Selection 7**<br>As selection 1, but analogue outputs instead of power and voltage.<br><br>**0** to move to the next choice<br>**1** to activate |
|  | **Selection 8**<br>As selection 2, but analogue outputs instead of power and voltage.<br><br>**0** to move to the next choice<br>**1** to activate |
|  | **Selection 9**<br>As selection 3, but analogue outputs instead of power and voltage.<br><br>**0** to move to the next choice<br>**1** to activate |
|  | **Selection 10**<br>This choice displays all temperatures and anlogue outputs status<br><br>**0** to move to the next choice<br>**1** to activate |

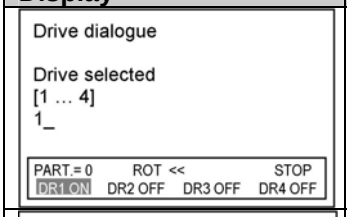
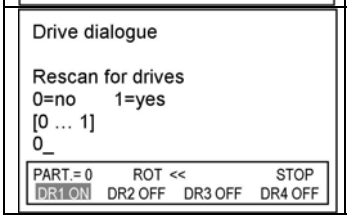
| | |
|---|---|
|  | **Selection 11**<br>Show alternatively for 5 s all blocks above, from choice 1 to choice 10<br><br>**0** to move to the next choice<br>**1** to activate |
|  | When you are operating a multi-axis sytem and select **1=yes** you will enter a list of choice as above and display at the same time 2 parameters for each drive. Here to you have the option of displaying alternate values for 5 s. Same parameters for all drives will be displayed at the same time. |

**Menu "Arrow Down": miscellaneous instructions**

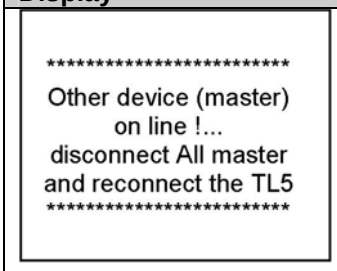
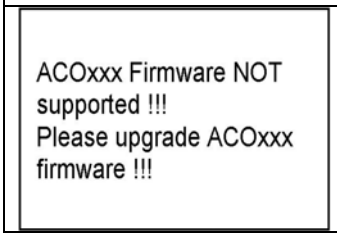
| Display | Description |
|---|---|
|  | With the sequence **2ndF "Arrow Down"** you can:<br><br>• set up the contrast of the display |
|  | Read the version number of the embedded firmware of the TL5 |
|  | Read the modification number of the embedded hardware of the TL5 |
|  | Transfer all the programmed data from the connected ACO5000 drive into the TL5 memory in order to transfert them to an other drive. |
|  | Download all the stored data drom a TL5 to the connected ACO5000 drive, an easy way to program identical drives. |
|  | When you want to download the save data from the TL5, you have the choice to save all partitions<br><br>**0** to move to the next choice<br>**1** to activate |

| | |
|---|---|
|  | Select here the partition number you want to copy… |
|  | And select here in which partition of the drive you want to download it. |

**Menu "Arrow Up": drive dialogue**

| Display | Description |
|---|---|
|  | With the sequence **2ndF "Arrow Up"** you can open the drive dialogue menu to select an other drive when operating a multi-drive configuration.<br>• Just key in the drive you want to connect to. |
|  | Instruction to rescan the configuration for drives.<br>**0** no action<br>**1** rescan the configuration |

**Warnings**

| Display | Description |
|---|---|
|  | This message is displayed in case of communication problem between the TL5 and the ACO5000.<br>It is displayed too when you connect the TL5 to a drive already connected to a PC via the USB port. As the message required it, just remove all the connections and reconnect the TL5 only.<br>For other messages please consult the user manual of the windows software, ref. S620_GB |
|  | The ACO5 firmware is not supported (older than version 1.50). Please use the windows software to proceed to the requested upgrade.<br>Please contact us to get the last version of the firmware. |

**Mechanical dimension and cutting**

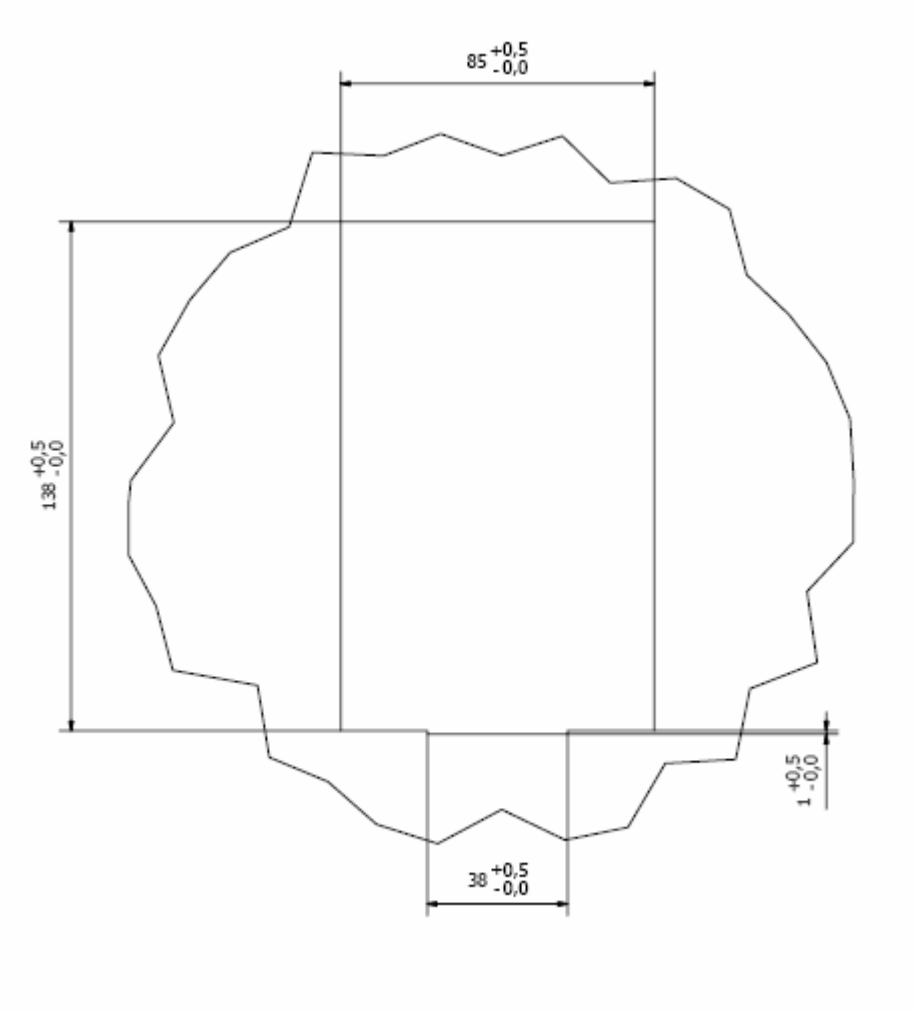
Overall dimensions H = 140 mm / W = 87 mm / T = 31 mm, weight 240 gr

**********

Part number: HTL5

**********

Cutting out in a cabinet door for TL5 integration, metal sheet thickness max. 2.5 mm




Dimensions in mm

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