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Tripod Turnstile Technical Manual

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SI-1236 Trzin, Slovenia

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fax: +386 1 56 10 744
web: www.metra.si

System: Metra Access Control
Product Group: Tripod Turnstile

Types:
- TTIS(CC) (ISO Reader)
- TTISIS(CC) (ISO Reader on both sides)
- TTRIS(CC) (ISO Wristband Capturer)
- TTRISIS(CC) (ISO Wristband Capturer and Reader)
- TTRCIS(CC) (ISO Card Capturer)
- TTRCISIS(CC) (ISO Card Capturer and Reader)
- TTMF(CC) (Mifare Reader)
- TTMFMF(CC) (Mifare Reader on both sides)
- TTRMF(CC) (Mifare Wristband Capturer)
- TTRMFMF(CC) (Mifare Wristband Capturer and Reader)
- TRCMF(CC) (Mifare Card Capturer)
- TRCMFMF(CC) (Mifare Card Capturer and Reader)

Year of Construction: 1995 - 2011

Declaration of Conformity:
The Metra Access Control products have been developed, designed and manufactured in accordance with the EU directive for Electromagnetic Compatibility (2004/108/EC).

Tripod Turnstile Technical Manual (rev.1-240812)
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Metra inženiring d.o.o. can assume no responsibility for any errors in this manual.

Product description

Tripod Turnstile is a complete, compact access control point. It combines motorized rotating barrier with RFID readers to control entrance and exit. Because everything is integrated into a single housing, it reduces required space for passage.

For exit control a patented Metra Wristband Capturer can be integrated to allow Ticket retain feature. The storage drawer for captured wristbands and/or cards is incorporated in the housing that is a combination of stainless steel body in matte finish and synthetic or carbon fibre reinforced resin cover. Fluent pedestrian passage is achieved by combination of visual LED and audio signalization and proximity sensors triggering motor driven rotating barrier. The drive was designed and proven to prevent any injury but is tough enough to withstand misuse at the same time. The barriers are free rotating if the mains power is down and can also be equipped with a special breaking fuse (mechanical) for the case of panic.
Tripod Turnstile is connected to Metra NET Network. When RFID Ticket is presented, access rights are checked in the Metra software check engines. If valid, the unit drives its rotating barrier in desired direction. Passage on Tripod Turnstile for a particular ticket can also be externally controlled by 3rd party SW via TCP/IP software interface. Metra software is used for event analyses and definition of operating parameters.

Ticket retain feature allows re-using of various tickets. For that innovative feature Metra has developed patented in 1998 contactless Wristband Capturer (WBC) together with contactless RFID Wristband. The Wristband Capturer grants exit signal only when the ticket is successfully erased and retained. This dramatically cuts costs of the system operation and the chance of fraud. A ticket will be retained under following conditions:

- Retain request written on it/assigned to it.
- It is presented to the retaining device.

### Basic parts

- **Wristband Capturer (optional)**
  
  Wristband Capturer is a retaining module for Metra RFID wristbands. It is integrated in different Metra products such as Tripod Turnstile and Turnstile Access Terminal. Consult the “Wristband Capturer – Technical Manual” for more details.

- **Antenna with Reader (optional)**
• On the outside

<table>
<thead>
<tr>
<th>#</th>
<th>description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Cover / Antenna / Wristband Capturer</td>
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<tr>
<td>2</td>
<td>Signalization panel</td>
</tr>
<tr>
<td>3</td>
<td>Ticket container/Cover</td>
</tr>
<tr>
<td>4</td>
<td>Proximity sensors</td>
</tr>
<tr>
<td>5</td>
<td>Barrier</td>
</tr>
<tr>
<td>6</td>
<td>Wristband capacity control windows</td>
</tr>
</tbody>
</table>

• On the inside

There are four main components inside the Tripod Turnstile. Those are: Master PCB, Slave PCB, Turnstile Drive Mechanism II (Mechanism and Motor Driver PCB) and Wristband Capturer (optional). Consult the “Turnstile Drive Mechanism II – Technical Manual” and “Wristband Capturer – Technical Manual” for more details about those two components.

<table>
<thead>
<tr>
<th>#</th>
<th>description</th>
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<tbody>
<tr>
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<td>2</td>
<td>Turnstile Drive Mechanism II</td>
</tr>
<tr>
<td>3</td>
<td>Master electronics board</td>
</tr>
<tr>
<td>4</td>
<td>Connection board</td>
</tr>
<tr>
<td>5</td>
<td>Slave electronics board</td>
</tr>
<tr>
<td>6</td>
<td>Optical proximity sensors</td>
</tr>
</tbody>
</table>
• Mounting set (optional)

Beforehand provided anchors (if the anchors are going to be built-in the pave)

• 2 x built-in anchors (left and right)
• 2 x spacers for anchors
• 6 x M8 nuts

• Choosing location for installation

Placement of device is chosen regarding the project plan. Take into consideration the following advices regarding the orientation and location of Tripod Turnstile(s):

• Receptionist should have good overview to the front side of the device(s).
• The best position regarding reception desk is that receptionist has access to incoming and leaving guests (extra payment on leaving).
• When an entrance for disabled persons is mounted, it needs to be at least 90 centimetres wide.

• If the device stands alone, you need to mount a barrier at 50 to 55 centimetres from edges or find already fixed barrier (wall, column, etc.). The barrier should be of the same high as the device, which is 1 metre.
- If there is more than one device in a row, only the first Turnstile needs a fixed barrier. Other devices are using next device as a barrier.

- On the left and right side of the device there need to be at least 30 cm of free space to take out the storage with captured tickets.

- Devices should also be protected from direct sun and rain. The best place for this purpose is inside the building or under projecting roof.
- At night or when device is out of control, it is better to have some kind of protection against vandalism (wire fence, door, etc.).
- When the device is installed directly on concrete foundation, durable carpet should be provided.
- Fixing the Turnstile is done in two levels which also enable micro settings and out of season demontage.
- When you do concrete, we advise to do larger surface (plate) for better solidity of installation.
• Wires installation

**NOTE**
Before the installation of the device the built-in anchors and wire installations must be checked.

• Anchor position (orientation)

Check the position of both built-in anchors and their height and position according to the pavement. Clean the surface of the built-in anchors.

• Preparation of wiring

Put a ribbed plastic hose Ø30 millimetres for installation of cables through the anchor on the **entrance side**. If installation requires (for example: external Enter/Exit buttons are on different location than Power supply and Metra Net Network), more than one ribbed plastic hose can be put in. Each installed cable should be at least 1.5 metre long from the ground.

• Wiring

**NOTE**
Cables are always installed through the leg on the **ENTRANCE SIDE** of the Tripod Turnstile.
<table>
<thead>
<tr>
<th>#</th>
<th>connection</th>
<th>mandatory / optional</th>
<th>wire / no. of conductors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24 VDC</td>
<td>Mandatory</td>
<td>1.5 mm² soft wire PPL / 2</td>
</tr>
<tr>
<td>2</td>
<td>Metra NET Network</td>
<td>Mandatory</td>
<td>Twisted pair or UTP cable / 2 (8 if UTP)</td>
</tr>
<tr>
<td>3</td>
<td>External ENTER / EXIT Buttons</td>
<td>Optional</td>
<td>0.75 mm² soft wire PPL / 4</td>
</tr>
</tbody>
</table>

**Anchor installation**

See chapter “Mounting set (optional)” for required mounting elements.

**STEP 1:** Fix iron anchor spacers to the anchors with supplied M8 nuts.

**STEP 2:** “Cut” sides of the anchor's (top view) should be placed at the Turnstile’s passage side.
STEP 3: Anchors are put onto the place where the tripod barrier device will stand. Be sure that anchors are balanced in both horizontal directions. The concrete is applied according to the final foundation (pave).

**NOTE**

Setting the 0/0 position: It is demanded that the anchor spacers are placed onto the final foundation of the existing level - the upper surface of both anchors is on the same level as ceramics, marble, final foundation, etc. When the concrete is dry, the anchor spacers are removed and can be used again.

STEP 4: Attach the Tripod Turnstile on the anchors and fix it with 6 x M8 nuts. Use M8 washers with external diameter at least 24 millimetres or bigger. Washers are not included with the anchors and must be bought separately or they are provided by Metra when installing the Tripod Turnstile. There are also rubber pads available if anchors are slightly out of level and they are also used for water insulation if needed. Contact Metra for more details.

STEP 5: Final position of devices should look like these.
Alternative mounting options are also possible.

If installing Tripod Turnstile indoors into a solid pavement, it can be mounted using wall plugs, anchor bolts, anchor screws, and even special glues. However, the underground wiring needs to be done before the installation of Tripod Turnstile. Method should be chosen depending on the pave type.

**NOTE**
Drilling holes in pavement is not advised in the following cases:
- Non-solid pavement.
- Floor heating.
- Other floor installations.

**NOTE**
Wiring scheme remains the same for all kinds of installations.

**• Opening cover**

**STEP 1:** Unlock and remove the ticket container on one side and the door on the other side of the Tripod Turnstile.

**STEP 2:** There is a buckle holding the Cover in place on each side. Unbuckle them.

**STEP 3:** Lift the Cover. If needed disconnect the signalization panel, Reader (if present) and Wristband Capturer (if present). Mark cables exact position.
• Connections

• Top

<table>
<thead>
<tr>
<th>#</th>
<th>description</th>
<th>#</th>
<th>description</th>
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</thead>
<tbody>
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<td>Semaphore Slave</td>
<td>8</td>
<td>Not Used</td>
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<tr>
<td>2</td>
<td>Semaphore Master</td>
<td>9</td>
<td>Power &amp; Metra NET Network</td>
</tr>
<tr>
<td>3</td>
<td>Wristband Capturer</td>
<td>10</td>
<td>Antenna Signalization LED</td>
</tr>
<tr>
<td>4</td>
<td>Reader Master (optional)</td>
<td>11</td>
<td>Metra NET Network</td>
</tr>
<tr>
<td>5</td>
<td>Reader Slave (optional)</td>
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<td>Metra NET Network</td>
</tr>
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<td>6</td>
<td>Not Used</td>
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<td>Not Used</td>
</tr>
<tr>
<td>7</td>
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### Bottom

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<tr>
<th>#</th>
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<tbody>
<tr>
<td>1</td>
<td>Pushbutton input – Master</td>
</tr>
<tr>
<td>2</td>
<td>Turnstile Drive Mechanism II communication connection</td>
</tr>
<tr>
<td>3</td>
<td>Turnstile Drive Mechanism II power connection</td>
</tr>
<tr>
<td>4</td>
<td>Not Used</td>
</tr>
<tr>
<td>5</td>
<td>Pushbutton input – Slave</td>
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<tr>
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<td>Not Used</td>
</tr>
<tr>
<td>7</td>
<td>Not Used</td>
</tr>
<tr>
<td>8</td>
<td>BDM Loader</td>
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<table>
<thead>
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</thead>
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<td>16</td>
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</table>
• Power supply connection

Regulated 24 VDC power supply is required for proper operation. Consult the Technical Specifications section of this document for current consumption.

Connect 24V DC regulated power supply to designated terminals. The terminals are marked as “+24” for positive connection and “gnd” for ground connection.

⚠️ WARNING ⚠️
• Mind the polarity! Wrong polarity could result in irreparable damage to the device.
• Respect power requirements data! Using unsuitable power supply could result in damage to the power supply and to the device.
NOTE
Make sure that Power/Network cable is connected to the distribution board.

Network connection

The network connection provides for operational functionality of the Tripod Turnstile. Different devices in parallel can be connected to the Network Controller by a single unshielded twisted pair (UTP) cable. Total length of the twisted pair cable is limited to 1 km. One Network Line Terminator must be connected at the far end of the network cable.

OPTION I:
Connect the twisted pair network cable to designated terminals. The terminals are marked as “C_L” for network low signal and “C_H” for network high signal.

OPTION II:
Connect the twisted pair network cable with RJ-45 connector to one of RJ-45 connectors on the “connection board”.

NOTE FOR OPTION II
There are 2 equivalent UTP connectors for Metra NET Network connection. One can be used as “trunk line IN” and the other as “trunk line OUT” connector. Take into consideration that if you disconnect one of the UTP cables (in or out), you also cut off the “trunk line” and devices after this device will be disconnected from the Metra NET Network. Therefore this type of connection is recommended only if you use Master and Slave Network Controllers TCP/IP, each on one side of the “trunk line”.

NOTE
• Mind the polarity of the network connection!
• Always connect the line terminator at the far end of the network cable!
### DIP switch settings

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Parameters request button - Slave</td>
</tr>
<tr>
<td>2</td>
<td>Network Address DIP switch - Slave</td>
</tr>
<tr>
<td>3</td>
<td>Parameters request button - Master</td>
</tr>
<tr>
<td>4</td>
<td>Operating Mode/Network Address DIP switch - Master</td>
</tr>
</tbody>
</table>

By changing the Network Address DIP Switch (2 and 4) pins positions, different network addresses can be set. To change between different pins positions, use a small flat headed screwdriver or similar object to push DIP switch pins to desired position.

After each settings change or after device’s first installation power off and back on the device (for the new settings to take effect) and obtain operating parameters if the device is connected to Metra NET Network controlled by Metra Network Controller and Metra SW.

Operating parameters are obtained through the Metra NET Network. The server must be set up and running for that purpose. To obtain operating parameters, press the PARAMETERS REQUEST buttons (1 and 3) on Master and on Slave electronics board.
• Operating mode and Network address

After installation is complete, the device's network addresses must be set by changing the Network Address DIP Switch (2 and 4) pins positions.

**NOTE**
Each Metra device must have different address setting.

Switches #1 and #2 are reserved for future use and must be set to OFF position (switch down).

Set switch #3 on Master electronics board according devices hardware configuration:
- OFF (switch down) indicates no Wristband Capturer is connected.
- ON (switch up) indicates the Wristband Capturer is connected.

Set switch #3 on Slave electronics board to OFF position (switch down).

Look up the code for desired Metra NET Network address in the coding table. Set switches #4 through #8 to indicated positions, where:
- 0 indicates the corresponding switch is in OFF position (switch down).
- 1 indicates the corresponding switch is in ON position (switch up).

<table>
<thead>
<tr>
<th>switch positions</th>
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<th>Slave address</th>
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<td>332</td>
</tr>
<tr>
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<td>301</td>
<td>333</td>
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<tr>
<td>0 0 0 1 0 0</td>
<td>302</td>
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<td>363</td>
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• Power-ON

To power button is situated on the connection board.
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<table>
<thead>
<tr>
<th>#</th>
<th>description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>F3.15 A 5mm x 20mm fast fuse</td>
</tr>
<tr>
<td>2</td>
<td>Power ON/OFF button</td>
</tr>
</tbody>
</table>

• **Spare Fuse**

Tripod Turnstile uses one F3.15 A 5mm x 20mm fast fuse. Spare one is located on the back of the connection board.
• **Safety features**

Different safety features are available on the Tripod Turnstile

• **Free passage**

If mains power is down the barrier is rotating freely in both directions.

• **Special braking fuses (optional)**

If even higher safety is required, barriers can be equipped with special braking fuses that brake if high force is applied to the barriers (people leaning on the barrier, mass of peoples push against the barrier). Barrier can be easily and quickly reinstalled using a new braking fuse.

• **Barrier calibration**

Each barrier (when in top position) should be perpendicular to the metal housing. Consult “Turnstile Drive Mechanism II – Technical Manual” for barrier calibration procedure.
• Maintenance

The maintenance service should perform a check on the device:
• At least once a year.
• When it has not been in use for a long time.
• When functional errors appear.

The device should be protected from mechanical damages, such as bending barriers and similar, which usually result from improper use like jumping over the barrier or climbing over the bars. Such abuse can be detected by proximity sensors and will be signalized by a beep sound, if enabled in device parameters.

• Cleaning

The device housing should be cleaned using only detergents, suitable for rust resistant metals. The resin cover should be cleaned using soft cloth and dedicated cleaners for plastic surfaces e.g. car dashboard cleaning agents. Do not use any aggressive or abrasive agents or solvents as they might cause permanent damage to the device surface.

• Technical data

Operating voltage  24V DC regulated; (22 – 30V DC tolerated)
Current consumption  2 A
Fuse  Fast Fuse 3.15 A
Operating temperature range  0 to +50 °C
Passage corridor width  50 cm
Barrier height  78.5 cm
Passage frequency  10-12 persons / min
Audio signal  integrated piezoelectric beeper
Visual signalization  LED semaphores
Network type  Metra NET Network
Barrier type  Motorized, absolute position magnetic sensor
Dimensions in mm (w/h/l)  740/980/1220

• Appendix

1  Physical dimensions

2  Typical Installation
3 Build-in Anchors

4 Concreting Composition

5 Concrete Installation with Anchors
   Concrete Installation with Anchor screws

6 Inner connections

7 Configuration: Wristband Capturer and Reader

8 Configuration: Wristband Capturer

9 Configuration: Reader on both sides

10 Configuration: Reader
Appendix 1

Tripod Turnstile

Physical dimensions
Tripod Turnstile

Typical Installation

- Entrance
- Reception Desk
- Passage for Disabled Persons
- Electric Lock
- Cabling
- Installation Pipe (PVC 30 mm)
- Exit

To Server Room
TOP VIEW
OTHER SIDE IS REFLECTED
CONCRETE INSTALLATION
MATERIAL: IRON PLATE 5mm
SURFACE FINISH: BLACK POWDER COATING

Build-in Anchors

HOLE FOR WIRING

SCREW M8
ANCHOR

SCREW M8
ANCHOR

SCREW M8
ANCHOR

Ø60

30
265
80
55
30

200
30
70
70
30

115

min 12.5

max. 150

5

min 12.5

max. 150
Concrete Installation with Anchors

Installation pipe (PVC 30 mm)
Final fundation
Anchor

Concrete

Concrete Installation with Anchor screws

Installation Pipe (PVC 30 mm)
Final fundation
Anchor screws
Anchor screws
Inner connections

- **OPTIONAL**
  - EXIT Pushbutton
  - ENTER Pushbutton

- **MASTER**
  - POWER MASTER TURN
  - RS232 PUSHBUTTON
  - SPARE FUSE

- **SLAVE**
  - POWER MASTER TURN
  - RS232 PUSHBUTTON
  - SPARE FUSE

- **LOCAL CAN**
  - READER MASTER
  - READER SLAVE
  - CAN SLAVE

Connection and power for the Turnstile Drive Mechanism

Appendix 6
Tripod Turnstile

Configuration: Wristband Capturer and Reader

Mounting plate (top side)

SIGNALIZATION

READER SLAVE

SEMAPHORE SLAVE

SEMAPHORE MASTER

WRISTBAND CAPTURER

+24
GND
C_H
C_L

Metra NET Network (OPTION B)

Metra NET Network (OPTION A)

24V DC
Tripod Turnstile

Configuration: Wristband Capturer

- Mounting plate (top side)
- SEMAPHORE MASTER
- SEMAPHORE SLAVE
- WRISTBAND CAPTURER
- Metra NET Network (OPTION A)
- Metra NET Network (OPTION B)
- 24V DC
Appendix 9

Tripod Turnstile

Configuration: Reader on both sides

SIGNALIZATION

SEMAPHORE MASTER
SEMAPHORE SLAVE
READER SLAVE
READER MASTER

Metra NET Network (OPTION A)
24V DC

Mounting plate (top side)
Tripod Turnstile

Configuration: Reader

Signalization:
- Semaphore Master
- Semaphore Slave
- Reader Master

Metra NET Network (OPTION A)
- 24V DC

Metra NET Network (OPTION B)