

IRISYS People Counter Family



Outdoor Housing



Indoor Housing

Introduction.

The IRISYS Thermal Imaging People Counter family is intended for a wide range of people counting, sensing and detection applications.

Principle of Operation

The units detect Infra-Red radiation and each contains a 16x16 array of Passive Infra-Red (PIR) sensors. They are ideally used in a downward looking manner, with an unhindered view of the target area. The unit functions optically, seeing the emitted heat as long wavelength light, through a germanium lens with a 60° field of view. The principle of operation may be visualised as being a square pyramid with a 60° apex. The sensing area is a square on the floor whose width is approximately equal to the mounting height; i.e. at 3.5m the unit 'sees' a 3.5m x 3.5m square on the floor. It will **not** see through glass or any other solid or transparent material (materials that are transparent to visible light are unlikely to be transparent to Infra-Red). A virtual counting-line is defined in the scene by the operator using a set-up tool, usually a palm top PC, and counting occurs when people passing through the scene cross the counting line in a defined direction. Mounting height ranges from 2.5-4.5m can be accommodated with the standard lens, and other lens options will be available to cover higher mounting heights. There is no calibration or scene-specific set-up required; the unit is mounted and is immediately functional. Rapid installation is possible and the 'cost of installation' is, therefore, low. The units may be used as single counting nodes, they can be linked into networks of up to 30 units or configured to span a wide opening. In the wide opening mode up to 8 units are linked to span the opening and will appear to the user system as a single counter unit with a wide 'footprint'. The wide opening mode contains intelligence that prevents possible multiple counting at the interface between adjacent units.

IRISYS People Counter Family

Interfaces & Data Output

Two styles of output are provided, which allow connectivity to the majority of user input/output protocols and other requirements. The simplest data output is by relay; there are two relays within the unit that are software configurable to provide count data from the system (in a simple implementation, this would be in and out counts across a simple line). The relays are solid-state and the pulse width can be software configurable ensuring compatibility with most input systems. The relays allow simple systems to be easily configured, and a stand-alone system can be implemented by connecting the relays to a widely available simple digital counter.

A data bus output is also provided; the implemented standard is the CAN system (Controller Area Network) which is a two-wire high-performance multi-drop bus standard with high noise immunity and the ability to drive over many hundreds of metres. This protocol has been chosen to allow system interconnection of up to 30 counters on a network, each unit having a defined address. The CAN protocol is widely used in instrumentation systems. For the purpose of easy connectivity, a CAN to RS232 conversion module is supplied allowing connection to standard serial or COM port style interfaces. User specified or custom interfaces may be considered if required by volume applications.

Housings

The IRISYS People Counter comes in two housings, intended for two areas of use. The 'outdoor' unit is housed in a robust die-cast aluminium housing with cable entry glands. This unit is intended either for outdoor use or for challenging indoor environments; the use of this enclosure, for example, may be recommended in doorways, where there is a significant chance of exposure to rain water. The 'indoor' unit is enclosed in a custom designed plastic enclosure and is intended solely for indoor use. The unit has been designed to resemble a smoke detector and to look in character within the majority of indoor commercial, retail and architect designed spaces. The 'outdoor' housing should always be chosen if there is any risk of moisture ingress.

Installation

The 'indoor' units are intended to be ceiling mounted; both through ceiling and on-ceiling wiring can be accommodated; for connection to suspended ceilings a special connection kit is provided. The unit is also designed to connect to a wide variety of conduit boxes. The unit can be removed without the need for ladders or climbing gear by the use of an extendable pole, allowing removal for cleaning or maintenance with ease. The 'outdoor' unit may be surface mounted or can be off-wall mounted by using the optional ball-joint mounting.

Wiring Options

The 'indoor' unit has a separate back-plate that carries a connection block allowing wiring from above. The front of the unit may be removed in a twist and push bayonet style (much like a domestic smoke detector). The 'outdoor' unit is connected by passing a cable through a cable entry gland and wiring to a connection block within the body of the unit. Both units require 12V power and ground connection and a choice of data interface options as defined below; the minimum cabling wiring would be 4; i.e. two power and two data.

Video Camera Option

Both units have the option for a video camera attachment, this is an optional accessory which may be used to set up the counter or record sequences if required. In the 'indoor' unit this is achieved by attachment of a side-mounted camera module intended for temporary use; the video output is acquired through the back-plate connector block. The 'outdoor' unit requires internal fitment of a camera, which must be specified on order (see appropriate data sheet). The video cameras have approximately the same field of view as the IR detector.

IRISYS People Counter Family

Set-Up and Software Interface

Once installed the units must be configured. This configuration takes the form of setting up the count lines and configuring relay operation if required. The standard set-up tool is a Compaq iPAQ palm-top PC. This allows set up by a lone operator and is also discrete and highly portable. Laptop or desktop PCs can be used as alternatives. The set-up tool connects to the 'indoor' unit by a front-connected interface module, which is removed once set-up is complete. All set-up instructions are loaded to a non-volatile storage area within the unit and are remembered, even after power down. The 'outdoor' uses a similar scheme; interconnection in this case uses a jack-plug connector accessed through a sealed blanking plate on the body of the unit.

Application Areas

Customer Counting for Retail	Car Parking Areas
Retail Analytics	Security
Market Research	Gallery & Museum
Leisure & Entertainment	Factory & Manufacturing
Transportation	Behavioural Analysis
Buildings	Access Control

Counter System Configuration Options

A number of system configurations are possible and it is necessary to choose the correct member of the people counter family appropriate to the installation. The four key options are:

Single Unit - This is a single unit used as a discrete counting node. The system interface may be relay or CAN bus as appropriate. If the CAN bus option is selected the CAN to RS232 module can be used to convert the protocol to the more familiar RS232 form, if required.

Wide Opening Function - This is a link of up to 8 units spanning a wide opening such as a shopping mall entrance or wide doorway. One of the units acts as the 'master node' and provides the system output from the link. The output from this unit can be Relay or CAN bus as appropriate.

Multi-Unit Networks - This is a link of up to 30 counting nodes and can be used to cover the entrances and exits from an entire retail outlet. Each member of the link has an address and reports address and count information to the bus when polled. CAN bus is used to link the units. The CAN to RS232 conversion module may be used at the end of the network

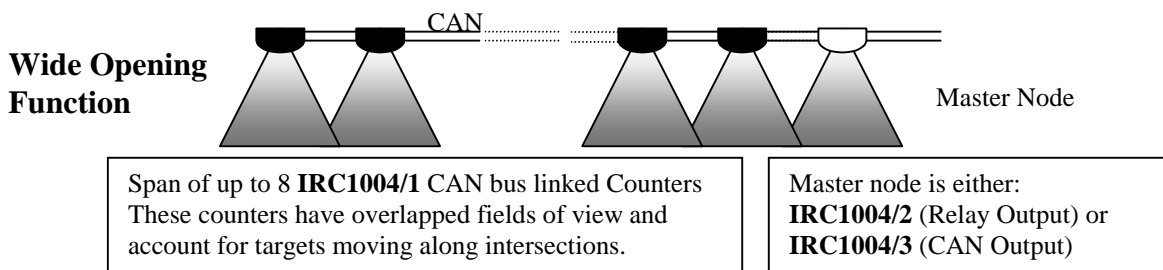
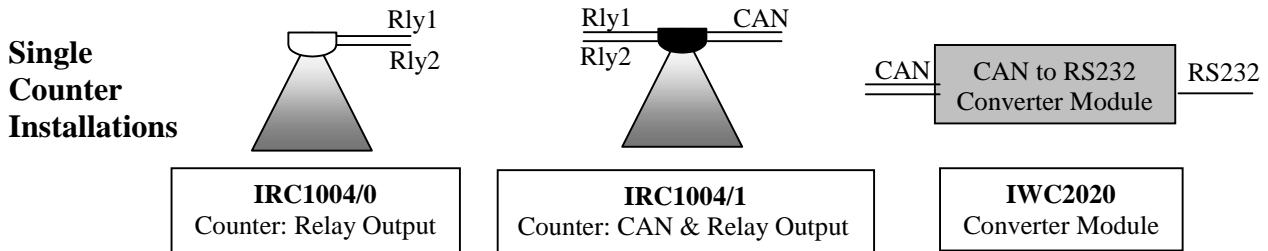
Multi-Unit Network plus Wide Opening Function - A link on the chain of 30 may be the 'master node' of a Wide Opening link. This allows wide doorways in to shops to be covered as part of the network. Again CAN bus is used as the protocol.

The specification for each of the nodes shown above can be found on the relevant product data sheet; descriptions of installation and application requirements can be found on the 'IRISYS People Counter Application Note'

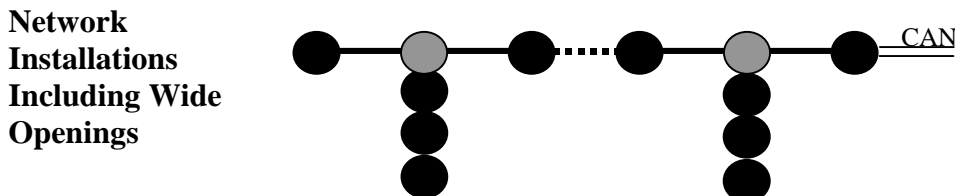
IRISYS People Counter Family

System Building Blocks

The IRISYS people counter family has been designed in a 'building block' style to allow a variety of interconnection and area coverage requirements to be met, and to allow interconnection to a range of user and host systems. Users should select nodes as appropriate to application and output requirement:



Chain of up to 30 **IRC1004/1** CAN bus connected counters forming a network, each counter having a unique ID & returning present counts to the CAN bus when polled.



A network can include links to 'Wide Opening' coupled counters; the linking units in this case will be the **IRC1004/3** terminator. Up to 30 **IRC1004/1** & **IRC1004/3** units may be linked on the main chain (the wide opening linked counters are seen as one link in the main chain).

Protocol Conversion

In all implementation of CAN bus interconnected systems, the accessory module **IWC2020** can be used to convert CAN protocol to RS232 serial interface format allowing simple interfacing to user systems.

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