Operating & Maintenance **Manual**

2024

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Cheetah

Contents

Introduction

CHEETAH SYSTEMS MUST ONLY BE INSTALLED BY TRAINED PERSONNEL

During the installation and commissioning of a *Cheetah* system, the installing engineers will program and configure the Cheetah system by using specialist software on a laptop computer that is connected to the LonWorks network. The *Cheetah* Configurator software is specifically designed to set up the system parameters, and to assign the correct LonWorks communications addressing between all the installed devices and in doing so configure the system. System components are self-identifying.

WARRANTY INFORMATION

Components of the *Cheetah* system (Display unit, sensor-processor/s, optical sensors, temperature sensors) have a (12mth) one-year warranty from the date of installation, for manufacture defects.

Malicious or accidental damage to any of the *Cheetah* systems after the system has been installed and commissioned will invalidate any warranty claims.

PROTECTION COULD BE IMPAIRED IF THIS PRODUCT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER

CUSTOMER SERVICE CONTACT DETAILS

In case it is required to check the operation of the Cheetah system remotely please contact the office line at 0118 973 9310.

If you are calling out of standard office hours (Monday to Friday 08.30 to 17.30) there may be an option to leave a message – if not, please email operations@quintex.co.uk

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[1.1] System Operation and Design Features

The purpose of the *Cheetah3 CUB* system is to save energy and control ventilation, depending on cooking activity, in commercial kitchens. This is achieved by continuously measuring the temperature in the extract canopy duct/s and controlling the extract fan/s and supply fan/s (where applicable), by using Variable Frequency Drives (Inverters).

Smoke and steam produced by cooking activity are also detected by laser optic sensors fitted to the extract canopy/s. The *Cheetah* system will quickly accelerate the ventilation fan/s to maximum speed when smoke or steam is detected, and continues to run at full speed for a pre-set time whilst the smoke or steam clears to fully purge vapours from the canopy/s. After any steam, and/or smoke, clears from the canopy; the system will then return to operating on temperature control. The Cheetah system will always react to the greatest demand either from temperature, steam, or smoke so that conditions in the kitchen are not compromised.

Based on the laws of affinity: a ventilation fan operating at half-speed uses only 13% of the full-speed operating power, but still moves half the volume of air that it would when running at full speed. Electricity consumption is therefore reduced by running the extract fans at lower average speeds.

Further power savings are made from the reduction of conditioned air being unnecessarily extracted through the extract system. *Cheetah* is designed to be an autonomous system; the fans are set to ramp down to a pre-set minimum speed when there is little or no demand. In most cases, the pre-set minimum speed is set to 50% (25Hz) of the maximum operating speed.

The Cheetah system is installed with remote GPRS communications and data-logging facilities. This allows systems installed at sites to be remotely accessed by *Quintex* (when required) and the system/s performance operation can be monitored over a period of time.

The Cheetah system can be fitted with a flow sensing device (optional extra – not fitted to all systems), which is used to provide an actual duct air flow rate and can be viewed on the Display information screen. The flow sensor is very useful in that the data can be used to identify maintenance or cleaning issues that may be required of the ventilation system.

The system has been designed so that any fault conditions will cause the connected fans to operate at full speed (50Hz) until the fault is corrected. Therefore, if a temperature or an optic sensor becomes faulty, the fans will run at full speed. Similarly, if the connected Inverter drive/s loses digital communications with the *Cheetah* system, they will run the motors at full speed until the communications are restored.

There is no direct link between *Cheetah* and a gas interlock system that may be present at a site. However, because the Cheetah system adjusts fan operating speeds, it can influence the operation of the interlock. As part of the Cheetah system commissioning process, Quintex will test for the minimum fan speed required to enable the gas supply, via any interlock system. The minimum speed will always be set above the minimum speed required. Over time, any site gas interlock system/s should be regularly maintained to ensure that the fan operation detection is consistent with the operation at the time that the *Cheetah* system was commissioned. Differential pressure sensing switches (used by gas interlock systems to sense airflow) can become blocked with contaminants (grease) and this can cause spurious gas interlock activations unless they are routinely cleaned.

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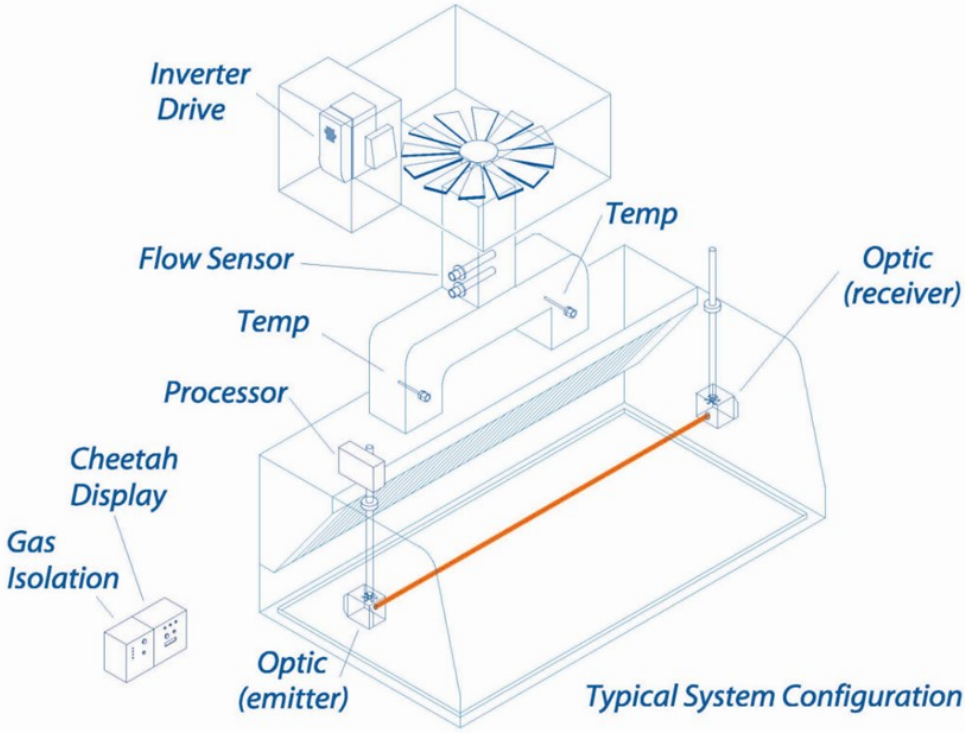
[1.2] System Operation and Design Features



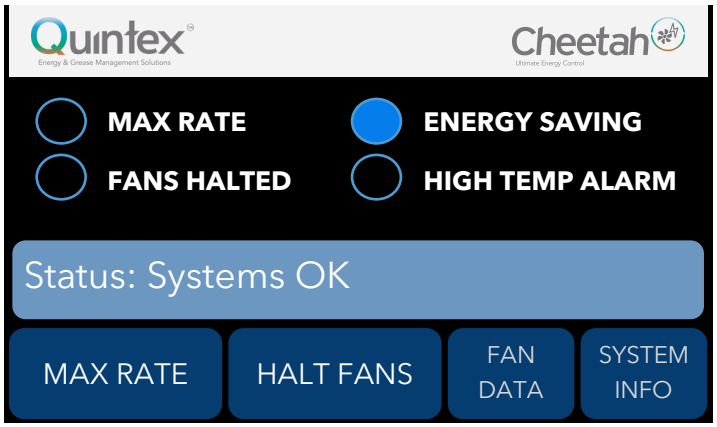
The main components of the Cheetah system are:

Component	Description
TEMPERATURE SENSORS	*Cheetah* temperature sensors are (usually) mounted in the extract canopy ductwork. They are in the main airflow.
OPTIC SENSORS	*Cheetah* optic sensors are Class-2 devices that include additional block-detection safety protection. They are installed in pairs and span the length of a canopy.
DISPLAY UNIT	The *Cheetah* Display unit provides an operator interface with the Cheetah system.
SENSOR-PROCESSOR UNIT	A *Cheetah* Sensor/Processor is a local HUB unit into which the relevant temperature and optics sensor equipment is plugged.
VARIABLE FREQUENCY DRIVE	Typically, the VFD is a Vacon 100 speed controller that is used to vary the speed of the connected fan, based on the control from the Cheetah system. Other VFDs may be accommodated with the use of a *Cheetah* Input/Output unit.
DATA-LOGGER (RCDLU)	The *Cheetah* Remote Communications Data Logger Unit provides direct communications to the *Cheetah* system via a GPRS modem. It can be accessed by the *Quintex* technical department.

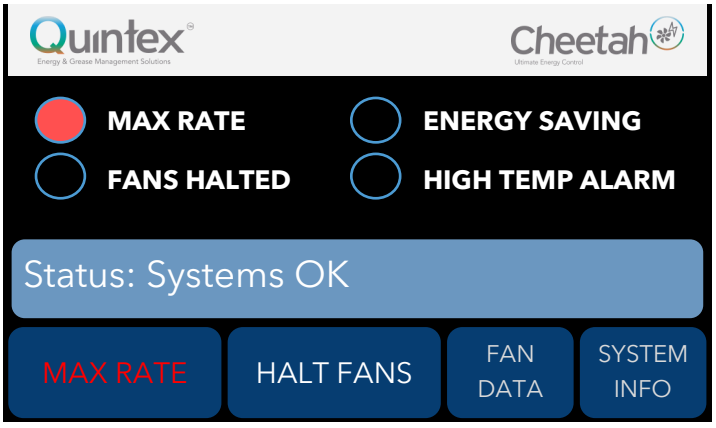
[2.0] Cheetah (C3) Display

The Display Unit is the part of the System that kitchen staff will see and interact with. Information relating to the running of the Cheetah System can be viewed and the standard system functioning can be overridden if required. The Display Unit is usually mounted on the kitchen wall but can also be installed in a 'back-of-house' or office area.

The screen will be backlit to verify that the Cheetah System has mains power. The ENERGY SAVING indicator will be illuminated whenever the fans are running at below maximum operation.

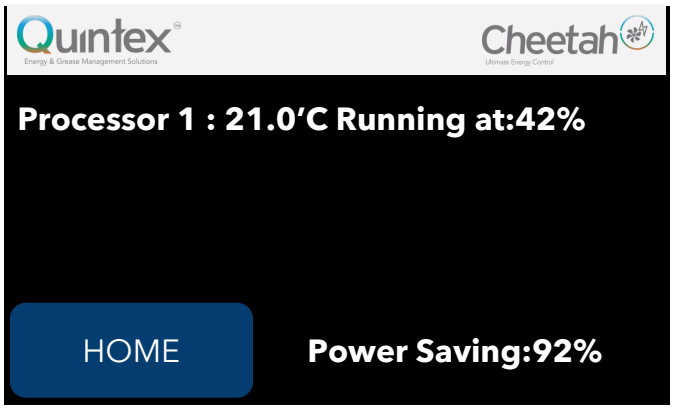


The display unit features an LCD touchscreen display with options for user input. The MAX RATE button forces the fans to full speed for a pre-set length of time. The default system override time is one hour. At the end of the pre-set override period (or when the MAX RATE button is pressed a second time), the system will revert to demand-controlled operation.

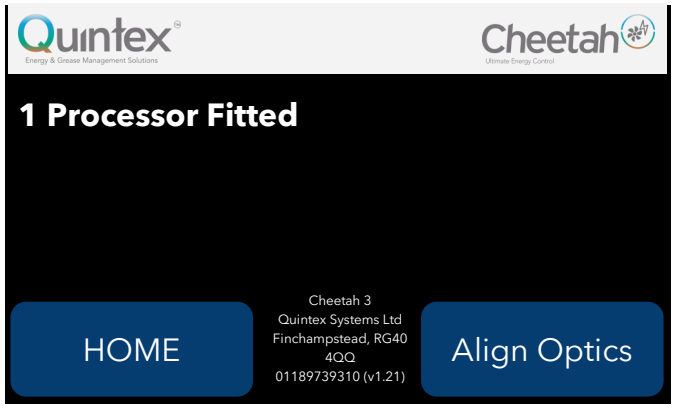


The HIGH TEMP ALARM indicator will be illuminated when the sensors in the ductwork detect an abnormally high temperature which may indicate a duct fire. The temperature at which this function activates is configurable by Quintex but defaults to 99° - should the temperature in the duct be this high, an alarm will sound from the Display and immediate action should be taken.

The HALT FANS button will command the fans to stop running. There will be a confirmation screen after this is pressed to ensure that the user wants the fans to stop, asking the user to press YES or NO (varies by version) The FANS HALTED text will display a red indicator beside it when the fans have been halted. To bring the fans back on, the HALT FANS (select NO) or MAX RATE option can be pressed.



Pressing the FAN DATA will reveal information on fan speeds and duct temperature.



Pressing the SYSTEM INFO will reveal information about the system such as how many processors and the option to align the Optic Sensors.

Pressing the ALIGN OPTICS will allow the user to re-align the optics if they are they are not optimal.

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Cheetah Display - Error Codes

If the Cheetah system identifies an error then an error code will be displayed on the screen. The table below shows what each error code relates to.

Error Code on LCD:	Error Type:	Code (in binary)
16	Network	00000000 00010000
32	Hood 1	00000000 00100000
64	Hood 2	00000000 01000000
96	Hoods 1 & 2	00000000 01100000
128	Hood 3	00000000 10000000
160	Hoods 3 & 1	00000000 10100000
192	Hoods 3 & 2	00000000 11000000
224	Hoods 3 & 2 & 1	00000000 11100000
256	Hood 4	00000001 00000000
288	Hoods 4 & 1	00000001 00100000
352	Hoods 4 & 2 & 1	00000001 01100000
416	Hoods 4 & 3 & 1	00000001 10100000
448	Hoods 4 & 3 & 2	00000001 11000000
480	Hoods 4 & 3 & 2 & 1	00000001 11100000

Descriptions of error type:

Network error – The display Unit cannot communicate with one or more of the configured Cheetah Units. Note that the inability to communicate with a VFD is not counted as a network error.

Hood error – The cause of this is the inability to communicate with a particular sensor. To determine which sensor is causing the problem, a trained Cheetah system engineer can interrogate the system. The value of the variable nvoHdErrors can be inspected either from the configurator or by remote access by a trained engineer with the correct equipment.

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3.0 Cheetah Input-Output Unit

For systems where there are pre-existing inverter drives, that cannot be LonWorks controlled; there is the option of installing a Cheetah Input-Output unit. The Cheetah In-Out unit is designed for applications where a conversion is required from the digital (LonWorks) communications (Cheetah system control) to analogue control signals. The In-Out device connects to (and is configured within) the Cheetah BUS network. The terminals will provide and receive, via a pre-wired length of cable that exits the In-Out unit; various control signals.

Analogue OUTPUT (0-10V) control signal
[Available on terminal **6** – (**WHITE** conductor), with terminal **5** – (**BLACK** conductor) as the ground]
This output provides the reference signal to an external device and is the commanded (percentage) fan running speed instruction from the Cheetah system. This commanded speed is based on the sensed conditions in the catering area.

There is an option (by means of a selector switch, internal to the In-Out unit) to allow for this output signal to be inverted (10-0V) – however, the connected device that is being controlled will need to be reconfigured to accept the inverted signal. By doing this a 'failsafe' (run to full speed) will be created if power to the Cheetah system (Display unit) should ever fail.

Analogue INPUT (0-10V) control signal
[Available on terminal 7 – (**RED** conductor), with terminal **5** – (**BLACK** conductor) as the ground]

This input allows the actual return (percentage) fan running speed be fed back from the controlled device to the Cheetah system. The actual running speed feedback should be connected, but in (rare) cases where this is not possible, the input signal should be linked back to the output signal for the operational continuity of a controlled supply fan.

Digital Logic ENABLE control signal (OUTPUT)
With this terminal connected to the controlled device, off-and-on controls from the Cheetah Display unit will enable and disenable (start and stop) the controlled device.

Digital Logic FAULT control signal (INPUT)
With this terminal connected to the controlled device, then a fault signal can be returned to the Cheetah unit – if a fault occurs.

Power Loss Relay (terminals) – [COMMON, NORMALLY-OPEN & NORMALLY CLOSED
The In-Out unit has terminals available that can be used to monitor the Cheetah system power supply. The on-board relay will change state when the system is un-powered (on loss of power or broken connection/cable). For devices that cannot have the control signal inverted, the relay offers a solution.
The external device can be directly controlled (e.g. Inverter drive, via I/O terminals), or the control can take place via a BMS system that is already integrated to the Inverter drive. For inverters that do not have a LonWorks option (eg. Invertek inverter drive), then the Cheetah Input-Output unit will provide the necessary D-to-A conversion. **(Refer to the connection diagram on the following page and refer the operating manual of the controlled device to determine the required connections and configuration, in each case).**

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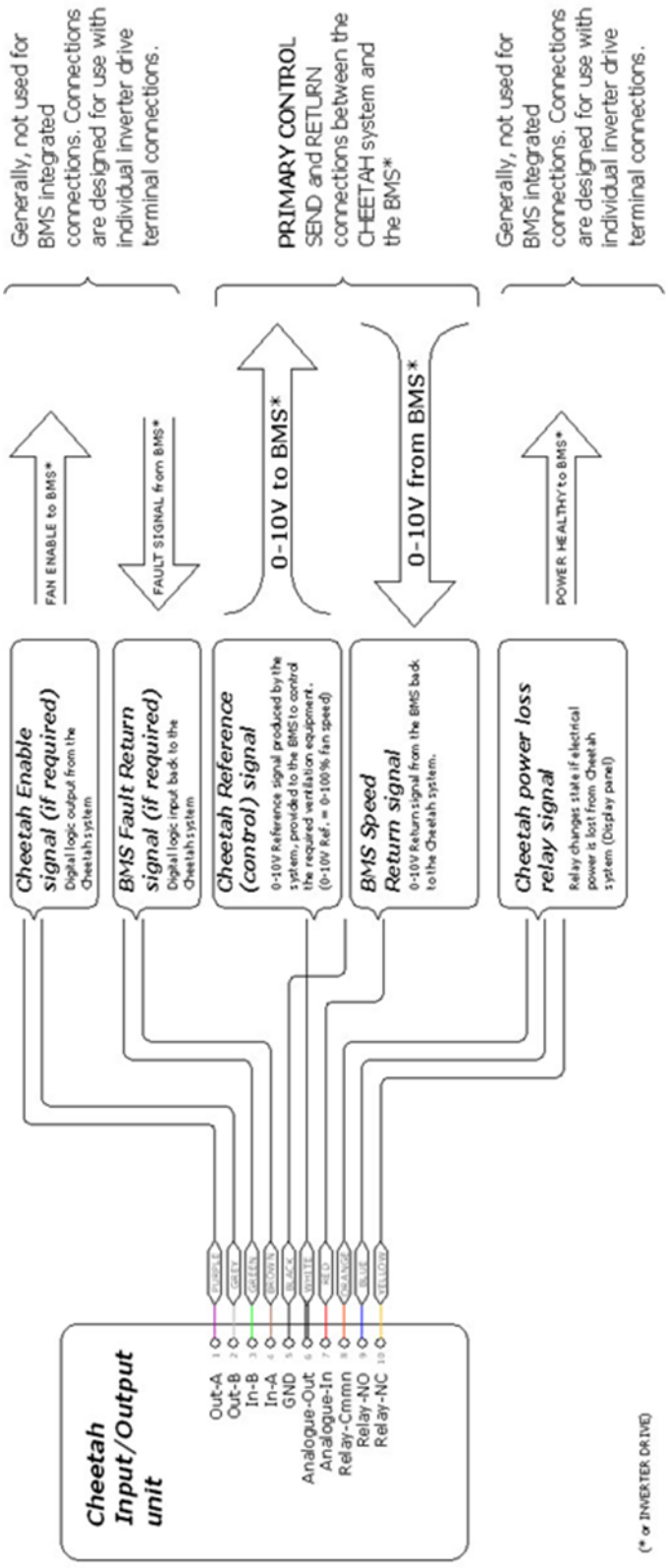
Cheetah Input-Output Unit Schematic Diagram



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4.0 Maintenance

4.1 Cleaning Optic Sensors

The *Cheetah* laser optic sensor and related circuit boards are contained within stainless-steel enclosures – with (internal) dirt-repellent clear covers installed over the laser apertures. It is recommended that the optic sensors are wiped (with a clean damp cloth) once a week to maintain a 'clear window'. Sustained direct pressure-jet washing of the laser aperture cover areas should be avoided.

4.2 Cleaning Temperature Sensors

The *Cheetah* system relies on temperature sensors to monitor the temperature in the extract ducts of the ventilation system. For optimum system performance, it is recommended that the temperature sensors are routinely cleaned every 6 to 12 months (depending on the cooking activity and the resulting contaminant build-up).

To clean the Cheetah system temperature sensor/s use a damp (lightly abrasive) scourer or steel wool to gently rub the grease and dirt build-up from the end of the temperature sensor. Using a mild detergent to dampen the scourer can also be beneficial in the cleaning process.

4.3 Cleaning Display unit

The *Cheetah* display unit can be wiped clean as part of normal kitchen cleaning, as required. Wipe with a mild fat solvent.

When cleaning the Cheetah Display unit, do NOT use an aggressive detergent, and do NOT spray wash.

4.4 Air Handling System – Maintenance

The *Cheetah* system relies on the equipment that it is controlling (the extract and supply ventilation air systems) to be in a good state of operational order so that it can operate at optimum efficiency and produce the best results. It is expected that the ventilation systems are sufficiently maintained; including regular belt maintenance, duct and filter cleaning as would be expected for any mechanical ventilation systems. It is important that a ventilation canopy has all filters in position, and that the filters have a regular cleaning schedule.

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5.0 Declaration of Conformity

EC DECLARATION OF CONFORMITY

In accordance with ISO IEC 17050-1 : 2010

Ref/conformity/declaration/issue4

We

Quintex Systems Ltd

of

40 Ivanhoe Road
Finchampstead
Berkshire
RG40 4QQ

Declare under our sole responsibility that the product described below

Brand and Model Name	CHEETAH 3
Equipment classification	ENERGY CONTROL AND SAFETY SYSTEM FOR COMMERCIAL CATERING.

is in conformity with the following standards

SUBJECT	STANDARD
Electromagnetic Compatibility	EN 61326-1:2006 (Class B Emission) EN 61326-1:2006 (Industrial Immunity levels) EN 61000-3-2:2006+A1+A2 (Harmonic Emissions) EN 61000-3-3:2008 (Voltage Fluctuations and Flicker) EN 301 489-7 V1.3.1 (GSM communication system)
Electrical Safety	EN 61010-1:2010
Radio Equipment	EN 301 511 V9.0.2

thereby meeting the essential requirements of Directive 2004/108 EC (the EMC Directive), Directive 2006/95 (the Low Voltage Directive) and Directive 1999/5/EC (Radio Equipment and Telecommunications Terminal Equipment).

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced Standards and meets all essential requirements of the EMC Directive, Low Voltage Directive and Radio Equipment and Telecommunication Terminal Equipment Directive.

Signed Dr J P Brooker BSc PhD *Signature* .....
Position R & D Manager
Location Finchampstead, England *Date* 8/11/13.....

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6.0 Electrical Schematic Wiring Diagram