DESCRIPTION

Woodward raised the standard in genset paralleling control and power management system with the easYgen-3000XT Series controllers. These controllers come with standardized software that is simple to configure, yet easily customized for individual applications. Enhanced connectivity enables fast, reliable and secure interfacing to other controls and communications systems while the enhanced hardware is a drop-in replacement for previous generation easYgen-3000 Series Controls.

The easYgen-3500XT with a dedicated CANopen network for connectivity to up to 16 LS-5 Circuit Breaker Controls, enables control of complex distribution systems having multiple utility feeds and tie breakers, and parallel load sharing of up to 32 generators on up to 32 different bus segments. Redundant load sharing is selectable using Ethernet B and C networks for improved reliability. The control combines complete engine-generator control and protection with advanced, peer-to-peer paralleling functionality and innovative features in a robust, attractive, user-friendly and all-in-one package. The easYgen-3500 XT controls are designed to direct connect up to 690Vac and operate to 4000m above sea level without derating.

The easYgen-3500XT is available in two packages. P1, focused at complex paralleling applications provides redundant Ethernet communication, LS-5 connectivity, and standard I/O set, while P2, Co-Gen/CHP model offers expanded onboard I/O set, 3-p busbar voltage measurement capability and an interface expansion card slot for an additional interface/protocol. These packages are available without a display in a rugged metal housing suitable for back panel installations (easYgen-3400XT-P1 and easYgen-3400XT-P2 respectively). A sophisticated touch screen panel (RP-3000XT) complements them as an operator control panel. A version of easYgen-3500XT (easYgen-3500XT-P1-LT and easYgen-3500XT-P2-LT) is designed to operate down to -40°C for outdoor applications.

FEATURES

- Full connectivity of up to 32 Generators and 16 LS-5 circuit breaker controls in one application
- Run-up synchronization / Dead Field Paralleling to quickly get several synchronous generators onto the load
- Three-phase true RMS power sensing with Class 1 accuracy
- Operation modes: AUTO, STOP, MANUAL, and TEST - accessible through face plate or discrete input
- Breaker control: Slip frequency / phase matching synchronization, open / close control, breaker monitoring
- Load transfer: open / closed transition, interchange, soft loading / unloading, Utility parallel
- Load share and device to device communication over CAN or Ethernet (Redundant possible)
- Remote control via interface (Modbus TCP, Modbus RTU) and via discrete/analog inputs for adjusting speed, frequency, voltage, power, reactive power, and power factor set points
- Freely configurable PID controllers for various control purposes, such as heating circuit control (CHP applications), water level, fuel level, pressure and / or other process variables
- Direct support to several ECUs: Scania S6, MTU ADEC ECU7/8/9, Volvo EMS2 & EDC4, Deutz EMR2 & EMR3, MAN MFR / EDC7, SISU EEM, Cummins and Woodward EGS02 ECU
- Field ECU support and additional I/O expansion board connectivity through sequencer files
- “System Update” function for online troubleshooting and adding / removing generator sets
- Time / Date synchronization over Simple Network Time Protocol (SNTP)
- Cylinder head / exhaust temperature monitoring (Temperatures come from J1939 or CANopen devices)
- Woodward ToolKit™ software for flexible setup from a single connection to the network. The ToolKit can be accessed either via USB, or via Ethernet, or via CAN ports.
- Multi-lingual capability; English, German, Spanish, French, Italian, Portuguese, Japanese, Chinese, Russian, Turkish, Polish, Slovakian, Finnish, Swedish

New Features

- Built-In Redundant Ethernet
- Power Measurement Class 1
- Direct Connect Up to 690 VAC
- AnalogManager & Editable Screens
- Multi-Interface ToolKit connectivity
- New face plate with tactile buttons
- Drop-In replacement

- Premium genset control for complex paralleling applications of up to 32 gensets and up to 16 MCB/GGB/Tie Breakers in
  - Prime Power & Cogeneration (CHP)
  - Peak shaving operation
  - Emergency operation
  - Import/Export operation
  - Islanded & Utility parallel operation

- Integrated Generator Group Breaker (GGB) control
- Run-Up Synchronization
- Master or Slave control capability
- Complete engine, generator and utility protection
- Up to 9 communication ports: 3xEthernet, 3xCAN (CANOpen and J1939), RS-485, USB, Interface expansion card
- Customizable logic, HMI screens, and alarms
- Dedicated low temperature display variants
- UL 61010, UL 6200, CSA, RoHS 2, and marine (ABS, LR) compliance
### SPECIFICATIONS

**Power supply**
- Intrinsic consumption: max. 22 W (LT: max. 32 W)
- Ambient temperature (operation): -20 to 70 °C (LT: -40 to 70 °C)
- Ambient temperature (storage): -30 to 80 °C / -22 to 176 °F
- Ambient humidity: 95%, non-condensing

**Voltage (software configurable)**
- 100 Vac, Rated (V<sub>rated</sub>) = 69/120 Vac
- Max. value (V<sub>max</sub>) = 86/150 Vac
- and 400/600 Vac, Rated (V<sub>rated</sub>) = 400/690 Vac
- Max. value (V<sub>max</sub>) = 520/897 Vac

**Rated surge voltage**
- 10% rise time, 8/20 μs

**Input resistance**
- 50 to 650,000 Ohms

**Accuracy**
- Class 0.5

**Measurable alternating windings**
- 3p-3w, 3p-4w, 3p-4w OD, 1p-2w, 1p-3w
- Setting range: primary
  - Linear measuring range: 1.25×V<sub>rated</sub>
  - Measuring frequency: 50/60 Hz (30 to 85 Hz)
  - High impedance input: Resistance per path: 2.5 MΩ
  - Max. power consumption per path: < 0.15 W

**Current (Isolated, software configurable)**
- Rated (I<sub>isol</sub>) = 1A or 5A
- Linear measuring range: I<sub>gen</sub> = 3.0×I<sub>isolated</sub>
- I<sub>max</sub> per path: 1.5×I<sub>isolated</sub>
- Setting range: 1 to 32,000 A
- Burden: < 0.10 VA

**Output (P2 only)**
- Rated short-time overcurrent (1 s): 50×I<sub>isolated</sub>, [5] 10×I<sub>isolated</sub>

**Accuracy**
- Class 0.5

**Power**
- Setting range: 0.5 to 99,999 kW/kVAr
- Accuracy: Class 1.0

**Discrete inputs**
- Isolated
- Input range: 12/24 V<sub>DC</sub> (8 to 40 V<sub>DC</sub>)
- Input resistance: approx. 20 kOhms

**Transistor outputs**
- Rated switching voltage: max. 24 V<sub>DC</sub>
- Maximum switching current: 40 V<sub>DC</sub>
- Maximum switching current: 300 mA DC
- Isolation Test voltage (<1s): 500 V<sub>AC</sub>
- Isolation voltage (continuously): 100 V<sub>AC</sub>

**Relay outputs**
- Contact material: AgCdO
- Load (GP): 2.00 A<sub>acc</sub>@250 Vac / 0.36 A<sub>acc</sub>@125 Vac / 0.18 A<sub>acc</sub>@250 Vac

**Analog inputs (isolated)**
- Resolution: 0 to 1 V / 0 to 2000 Ohms / 0 to 20 mA
- Type 1 (isolated): 0 to 10 V / 0 to 20 mA
- Type 2 (P2 only): 0 to 10 V / 0 to 20 mA

**Analog outputs (isolated)**
- Resolution: freely scalable
- Type 1 (isolated): ± 10 V / ± 20 mA / PWM
- Basic insulation voltage (continuously, AVR<sub>max</sub>): 500 V<sub>AC</sub>
- Reinforced insulation voltage (continuously, AVR<sub>max</sub>): 300 V<sub>AC</sub>
- Insulation voltage (continuously, Gov<sub>max</sub>): 100 V<sub>AC</sub>
- Resolution: 12 Bit
- Output ± 10 V (scalable): maximum load 500 Ohms
- Output ± 20 mA (scalable): maximum load 500 Ohms
- Insulation voltage (continuously): 100 V<sub>AC</sub>
- Insulation voltage (test; >2 s): 1700 V<sub>AC</sub>
- Resolution: 12 Bit

**Housing**
- Front panel flush mounting: Plastic housing
- Dimensions: WxHxD: 282 × 216 × 96 mm
- Front cutout: WxH: 249 [+1.1] × 183 [+1.0] mm
- Connection: screw/plug terminals 2.5 mm²
- Front: Insulating surface: IP66 (with screw fastening)
- Sealing: Front: IP54 (with clamp fastening)
- Back: IP20
- Weight: approx. 1.850 g

**Housing**
- Back panel mounting: Powder Coated Sheet metal housing
- Dimensions: WxHxD: P1: 250 × 228 × 50 mm
- P2: 250 × 228 × 84 mm
- Connection: screw/plug terminals 2.5 mm²
- Protection system: IP20
- Weight: approx. 1.750 g

**Disturbance test (CE)**
- Tested according to applicable IEC standards

**Listings**
- CE, UL, EAC, VDE, BDEW, CSA

**Marine**
- LR (Type Approval), ABS (Type Approval)

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*3 phase 3 wire Δ constellations are limited to 600 Vac system*
## DIMENSIONS

**Plastic housing for front panel mounting**

- Width: 262mm
- Height: 86.2mm
- Depth: 247mm

**Metal housing for cabinet mounting**

- Width: 227mm
- Height: 250mm
- Depth: 84.8mm

P1: 96mm

P1 is more compact (note depth/height in blue)

## TERMINAL DIAGRAM

<table>
<thead>
<tr>
<th>Sinking Output</th>
<th>Analog Inputs</th>
<th>Generator Current AC</th>
<th>Analog Inputs</th>
<th>Analog Outputs</th>
<th>Busbar Voltage AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 33 34 35 36</td>
<td>1 2 3 4 5 6 7</td>
<td>8 9 10 11 12 13 14</td>
<td>15 16 17 18 19</td>
<td>20 21 22 23 24</td>
<td>25 26 27 28 29</td>
</tr>
</tbody>
</table>

- **P2:** pins 01-160 as shown above; **P1:** pins 01-80 only!

## RELATED PRODUCTS

- Remote Panel RP-3000XT (Product Specification # 37592)
- ToolKit (Product Specification # 03366)
- I/O Expansion Board IKD1 (Product Specification # 37171)
- Engine Speed Control actiVgen (Product Specification # 03419): P/N 8440-2100
- Load Share Gateway LSG (Product Specification # 37451)
- Electronic Pickup Unit EPU-100 (Product Specification # 37562)
- CANbus based Remote Annunciator (Product Specification # 37279): easYlite 100 P/N 8446-1023
- Power Generation Learning Module (Product Specification # 03412): P/N 8447-1012
- Data TelegramMapper software (Application Note # 37684)
- Profibus Gateway (Application Note # 37577): ESEPRO P/N 8445-1046
- Ethernet (Modbus/TCP) Gateway (Application Note # 37576): ESENET P/N 8445-1044
- CANbus to Fiber Optic Converters (Application Note # 37598): DL-CAN P/N 8445-1049 and DL-CAN-R P/N 8445-1048
- Remote Access Gateway (with HMS Netbiter EasyConnect EC250 and EC350)
- Thermocouple Scanner (AXIOMATIC AXTC20)
- WAGO and Phoenix expansion CAN Couplers
# easYgen-3000XT Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Package</th>
<th>3400XT</th>
<th>P1</th>
<th>P2</th>
<th>P1(-LT)</th>
<th>P2(-LT)</th>
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<tbody>
<tr>
<td>Measuring</td>
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<tr>
<td>Generator voltage (up to 690 Vuc)</td>
<td>3-ph</td>
<td>3-ph</td>
<td>3-ph</td>
<td>3-ph</td>
<td>3-ph</td>
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<tr>
<td>Generator current (A or 5 A software selectable)</td>
<td>3-ph</td>
<td>3-ph</td>
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<tr>
<td>Mains voltage (up to 690 Vuc)</td>
<td>1-ph</td>
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<tr>
<td>Mains or ground current (A or 5 A software selectable)</td>
<td>1-ph</td>
<td>1-ph</td>
<td>1-ph</td>
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<td>1-ph</td>
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<tr>
<td>Busbar voltage (up to 690 Vuc)</td>
<td>1-ph</td>
<td>1-ph</td>
<td>1-ph</td>
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<tr>
<td>Control</td>
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<tr>
<td>Breaker control logic (open and closed transition &lt;100 ms)</td>
<td>FlexApp*</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Number of supported Woodward LS-5 units (1 or 2 breaker controls)*1</td>
<td>16</td>
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<tr>
<td>Automatic, Manual, Stop, and test operating modes</td>
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<tr>
<td>Single and multiple-unit operation</td>
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<tr>
<td>Mains parallel multiple-unit operation (up to 32 units)</td>
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<tr>
<td>AMF (auto mains failure) and stand-by operation</td>
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<tr>
<td>Critical mode operation</td>
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<tr>
<td>GCB and MCB synchronization (+slipping / phase matching)</td>
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<tr>
<td>GGB (Generator Group Breaker) Control</td>
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<tr>
<td>Import / export control (kW and kvar)</td>
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<tr>
<td>Load-dependent start/stop</td>
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<tr>
<td>n.f., V, P, Q, and PF control via analog input or interface</td>
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<tr>
<td>Load/var sharing for up to 32 gensets</td>
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<tr>
<td>Freely configurable PID controllers</td>
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<tr>
<td>HMI</td>
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<tr>
<td>Color Display with Softkey operation</td>
<td>DynamicsLCD*</td>
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<tr>
<td>Start/stop logic for diesel / gas engines</td>
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<tr>
<td>Counters for operating hours / starts / maintenance / active/reactive energy</td>
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<tr>
<td>Configuration via PC (USB serial connection &amp; ToolKit software (included))</td>
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<tr>
<td>Event recorder entries with real time clock (battery backup)</td>
<td></td>
<td>1000</td>
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<tr>
<td>Operating Temperature</td>
<td></td>
<td>-40 to 70 °C</td>
<td>-40(0)-20 to 70 °C</td>
<td>-40(0)-20 to 70 °C</td>
<td>-40(0)-20 to 70 °C</td>
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<tr>
<td>Protection</td>
<td></td>
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</tr>
<tr>
<td>Generator: voltage / frequency</td>
<td>59 / 27 / 810 / 81U</td>
<td>23 (9)</td>
<td>23 (20)</td>
<td>12 (9)</td>
<td>23 (20)</td>
<td></td>
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<tr>
<td>Generator: overload, reverse/reduced power</td>
<td>32 / 32R / 32F</td>
<td>23 (9)</td>
<td>23 (20)</td>
<td>23 (9)</td>
<td>23 (20)</td>
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<tr>
<td>Generator: Synch Check</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
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<tr>
<td>Generator: unbalanced load</td>
<td>46</td>
<td>46</td>
<td>46</td>
<td>46</td>
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<tr>
<td>Generator: instantaneous overcurrent</td>
<td>50</td>
<td>50</td>
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<td>50</td>
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<tr>
<td>Generator: time-overcurrent (IEC 255 compliant)</td>
<td>51 / 51 V</td>
<td>50G</td>
<td>50G</td>
<td>50G</td>
<td>50G</td>
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<tr>
<td>Generator: ground fault (measured ground current)</td>
<td>50G</td>
<td>50G</td>
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<tr>
<td>Generator: power factor</td>
<td>55</td>
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<td>Generator: rotation field</td>
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<tr>
<td>Engine: overspeed / underspeed</td>
<td>12 / 14</td>
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<td>12 / 14</td>
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<tr>
<td>Engine: speed / frequency mismatch</td>
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<tr>
<td>Engine: D+ auxiliary excitation failure</td>
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<tr>
<td>Engine: Cylinder temperature</td>
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<tr>
<td>Mains: voltage / frequency / synch check</td>
<td>59 / 27 / 810 / 81U / 25</td>
<td>78</td>
<td>78</td>
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<tr>
<td>Mains: phase shift / rotation field / ROCOF (df/dt)</td>
<td>78</td>
<td>78</td>
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<tr>
<td>Busbar: voltage / frequency / Phase Rotation</td>
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<tr>
<td>I/Os</td>
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<tr>
<td>Speed input: magnetic / switching; Pickup</td>
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<tr>
<td>Discrete alarm inputs (configurable)</td>
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<tr>
<td>Discrete outputs, configurable</td>
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<tr>
<td>External discrete inputs / outputs via CANopen</td>
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<tr>
<td>Analog inputs: ±10V, ±20mA, PWM; configurable</td>
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<tr>
<td>Analog outputs: 0 to 20 mA (0 to 10 V with external 500Ω resistor)</td>
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<tr>
<td>External analog inputs / outputs via CANopen</td>
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<tr>
<td>Display and evaluation of J1939 analog values, “supported SPNs”</td>
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<tr>
<td>CAN bus communication interfaces FlexCAN*</td>
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<tr>
<td>Ethernet Modbus TCP Slave interface</td>
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<tr>
<td>USB Serial interface</td>
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<tr>
<td>RS-485 Modbus RTU Slave interface</td>
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<tr>
<td>Interface Expansion Capability</td>
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<tr>
<td>Listings/Approvals</td>
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<tr>
<td>UL / cUL Listing (81010 &amp;200), CSA (USA and Canada), BDEW, VDE, EAC, CE Marked</td>
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<tr>
<td>LR, ABS Marine</td>
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<tr>
<td>Part Numbers</td>
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<tr>
<td>Front panel mounting with display (… and enhanced operating temperature range)</td>
<td></td>
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<td>8440-2085</td>
<td>8440-2085</td>
<td>8440-2085</td>
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<tr>
<td>Cabin back mounting w/o display</td>
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<td></td>
<td>8440-2084</td>
<td>8440-2084</td>
<td>8440-2084</td>
<td>8440-2084</td>
</tr>
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</table>

*1 The easYgen-3000XT communication system allows up to 48 members on the bus.
*2 If the easYgen count is reduced from 32, the LS-5 count can be increased (up to 32).
*3 CAN bus freely selectable during configuration between CANopen or J1939; please feel free to request more information.
*4 A screw and a clamp kit are delivered with the unit for fastening.