Honeywell

Thermostats Line Guide



Precision engineering. Commercial sense. From the exacting needs of high-end industrial and aerospace applications to commercial safety and office equipment usage, Honeywell Sensing and Control (S&C) thermostat solutions are the recognized, respected leader. Both our commercial and precision snap-action thermostats include automatic and manual reset options, phenolic or ceramic housings and a wide variety of mounting brackets and terminal options — while our precision line includes both hermetic and non-hermetic devices. And each thermostat's design is configured from a base unit, and can be customized for temperature tolerance and mechanical configurations, meeting any of your needs for accuracy and exactitude. It makes sense to trust industry-leading engineering and innovation.

FEATURES

COMMERCIAL THERMOSTATS

2450A Series.

Features: Cost effective • Gold alloy contacts • Epoxy-sealed cap and terminals • Wide variety of terminals • Only a stepped aluminum cap - 15' spacing, 1" collector for 30' spacing, and a 1.5" collector for 50' spacing. Collector brackets available per UL

Benefits: Gold alloy contacts for low voltage fire alarm, smoke detector and potential security device applications. Small size allows enhanced response to temperature changes. Epoxy sealed for extended life. Available with or without heat collectors. Potential for use in office copy machines, heat and smoke detectors, HVAC equipment, computers, aircraft/aerospace, radar equipment, medical equipment, and electronic control systems.

2450CM Series.

Features: Cost effective • Rivet sleeve construction • Wide variety of mounting brackets and terminals

Benefits: Small size allows enhanced response to temperature changes. Potential for use in high current HVAC, appliance, hot water heater and office automation applications.

2450CMG Series.

Features: Cost effective • Gold alloy contacts • Rivet sleeve construction • Wide variety of mounting brackets and terminals

Benefits: Small size allows enhanced response to temperature changes. Gold alloy contacts for potential use in low voltage HVAC, appliances, hot water heater and office automation applications.

2450HR Series.

Features: Cost effective • Rivet sleeve construction • Factory calibrated • Wide variety of mounting brackets and terminals

Benefits: Small size allows enhanced response to temperature changes. Factory calibrated to customer's specs. 4-posted "H" construction for application mounting bracket. Potential for use in HVAC, major appliances, automotive, heat and smoke detectors and office copy machines.

2450HRG Series.

Features: Cost effective • Gold alloy contacts • Rivet sleeve construction • Factory calibrated • Wide variety of mounting brackets and terminals

Benefits: Small product size allows enhanced response to temperature changes. Factory calibrated to customer's specification. 4-posted "H" construction for application mounting bracket. Gold alloy contacts for low voltage HVAC, major appliance, automotive, heat/smoke detectors and copy machine potential applications.

continued on page 7

Thermostats Line Guide

Well over 5,000 reasons to choose Honeywell.
With over 5,000 quality components in our thermostat line, we meet any domestic or international need for commercial or precision snap-action solutions.

Commercial thermostats: You'll find Honeywell quality in a wide array of small and major appliances, automotive applications, office copy machines and HVAC equipment, plus heat and smoke detectors. Whether it's military or aerospace industries, or your office building, each Honeywell S&C thermostat can be designed to offer the performance and reliability you demand, and the service you need.

Precision thermostats: A highly reliable lineup for potential high-end applications, including computers, copy machines, aircraft, radar, medical equipment and electronic control systems — each designed to meet the most stringent environmental conditions for dielectric strength, moisture, resistance, vibration, shock and hermetic seal. And S&C offers custom-packaged thermostats for complete application flexibility.





Commercial Thermostats	2450A Series	2450CM Series	2450CMG Series
Use	heat detection	high current	low voltage
Reset type	automatic	manual	manual
Housing material	phenolic, epoxy seal cap and terminals	ceramic	ceramic
Functional property	open or close on rise	open on rise	open on rise
Amperage	3 A	15 A/10 A	0.5 A
Operating temperature range	47 °C to 107 °C [117 °F to 225 °F]	52 °C to 232 °C [125 °F to 450 °F]	52 °C to 232 °C [125 °F to 450 °F]
Environmental exposure range	0 °C to 150 °C [32 °F to 302 °F]	10 °C to 260 °C [50 °F to 500 °F]	10 °C to 260 °C [50 °F to 500 °F]
Contacts	WE-1 gold alloy cross point	silver/nickel alloy	WE-1 gold alloy cross point
Approvals	UL	UL, CSA, VDE	UL, CSA, VDE





Commercial Thermostats	2450HR Series	2450HRG Series	2450R Series
Use	high current	low current	high current
Reset type	automatic	automatic	automatic
Housing material	phenolic	phenolic	phenolic
Functional property	open or close on rise	open on rise	open or close on rise
Amperage	15 A/10 A	0.5 A	15 A/10 A
Operating temperature range	0 °C to 150 °C [32 °F to 302 °F]	0 °C to 150 °C [32 °F to 302 °F]	0 °C to 150 °C [32 °F to 302 °F]
Environmental exposure range	-18 °C to 177 °C [0 °F to 350 °F]	-18 °C to 177 °C [0 °F to 350 °F]	-18 °C to 177 °C [0 °F to 350 °F]
Contacts	silver/nickel alloy	WE-1 gold alloy cross point	silver/nickel alloy
Approvals	UL, CSA	UL, CSA	UL, CSA

Commercial Thermostats





	2450RC Series	2450RCG Series	2450RG Series
Use	high current	low voltage	low voltage
Reset type	automatic	automatic	automatic
Housing material	ceramic	ceramic	phenolic
Functional property	open or close on rise	open or close on rise	open or close on rise
Amperage	15 A/10 A	0.5 A	0.5 A
Operating temperature range	0 °C to 260 °C [32 °F to 500 °F]	0 °C to 260 °C [32 °F to 500 °F]	0 °C to 150 °C [32 °F to 302 °F]
Environmental exposure range	-20 °C to 287 °C [0 °F to 550 °F]	-20 °C to 287 °C [0 °F to 550 °F]	-18 °C to 177 °C [0 °F to 350 °F]
Contacts	silver/nickel alloy	WE-1 gold alloy cross point	WE-1 gold alloy cross point
Approvals	UL, CSA, VDE	UL, CSA, VDE	UL, CSA

Commercial Thermostats





	2455R Series	2455RA Series	2455RVB Series
Use	high current	heat detection	high current
Reset type	automatic	automatic	automatic
Housing material	phenolic	phenolic, epoxy seal cap and terminals	ceramic, epoxy overmold
Functional property	open or close on rise	close on rise	open or close on rise
Amperage	15 A/10 A	3 A	15 A/10 A
Operating temperature range	0 °C to 150 °C [32 °F to 302 °F]	47 °C to 107 °C [117 °F to 225 °F]	-12 °C to 105 °C [10 °F to 250 °F]
Environmental exposure range	-18 °C to 177 °C [0 °F to 350 °F]	0 °C to 150 °C [32 °F to 302 °F]	-18 °C to 121 °C [0 °F to 250 °F]
Contacts	silver/nickel alloy	WE-1 gold alloy cross point	silver/nickel alloy
Approvals	UL, CSA, VDE	UL	UL, CSA, VDE

Thermostats Line Guide

Commercial Thermostats







	2455RC Series	2455RG Series	2455RM Series
Use	high current	low voltage	high current
Reset type	automatic	automatic	manual
Housing material	ceramic	phenolic	phenolic
Functional property	open on rise	open or close on rise	open on rise
Amperage	15 A/10 A	0.5 A	15 A/10 A
Operating temperature range	0 °C to 260 °C [32 °F to 500 °F]	0 °C to 150 °C [32 °F to 302 °F]	0 °C to 150 °C [32 °F to 302 °F] (inclusive)
Environmental exposure range	-20 °C to 287 °C [0 °F to 550 °F]	-18 °C to 177 °C [0 °F to 350 °F]	-18 °C to 260 °C [0 °F to 500 °F]
Contacts	silver/nickel alloy	WE-1 gold alloy cross point	silver/nickel alloy
Approvals	UL, CSA, VDE	UL, CSA, VDE	UL, CSA, VDE

Precision Thermostats



	3000 Series
Description	custom packaged
Amperage	7.0 A resistive
Housing material	stainless steel or brass
Operating temperature	-29 °C to 260 °C [-20 °F to 500 °F]
Environmental exposure range	-62 °C to 288 °C [-80 °F to 550 °F]
Dielectric strength	MIL-STD-202, Method 301; 1250 Vac 60 Hz - Terminal to Case
Insulation resistance	MIL-STD-202, Method 302; 50 MOhm min. Terminal to Case
Contact resistance	MIL-STD-202, Method 307; 0.050 Ohm
Hermetic seal	MIL-STD-202, Method 112; Cond. A, 1x10-5 atm cc/s
Moisture resistance	MIL-STD-202, Method 106
Shock	N/A
Vibration	N/A
Thermal shock	N/A
Salt spray	N/A
Acceleration	N/A







Precision Thermostats	3100 Series	3100U Series	3106 Series
Description	hermetic	UL-approved hermetic	low level hermetic
Amperage	2.0 A/1.0 A/5.0 A/5.0 A	3.0 A resistive max.	100 mA/500 mA
Housing material	steel housing hermetically sealed with glass-to-metal seal at terminal junction	steel housing hermetically sealed with glass-to-metal seal at terminal junction	steel housing hermetically sealed with glass-to-metal seal at terminal junction
Operating temperature	-29 °C to 260 °C [-20 °F to 500 °F]	-29 °C to 260 °C [-20 °F to 500 °F]	-29 °C to 204 °C [-20 °F to 400 °F]
Environmental exposure range	-62 °C to 288 °C [-80 °F to 550 °F]	-62 °C to 288 °C [-80 °F to 550 °F]	-62 °C to 260 °C [-80 °F to 500 °F]
Dielectric strength	MIL-STD-202, Method 301; 1250 Vac 60 Hz - Terminal to Case	MIL-STD-202, Method 301; 1250 Vac 60 Hz - Terminal to Case	MIL-STD-202, Method 301; 1250 Vac 60 Hz - Terminal to Case
Insulation resistance	MIL-STD-202, Method 302; Cond. B - 500 MOhm - 500 Vdc applied	MIL-STD-202, Method 302; 50 MOhm or MIL-STD-202, Method 302; Cond. B - 500 MOhm - 500 Vdc applied	MIL-STD-202, Method 302; Cond. B - 500 MOhm - 500 Vdc applied
Contact resistance	MIL-STD-202, Method 307; 0.050 Ohm	MIL-STD-202, Method 307; 0.050 Ohm max.	MIL-STD-202, Method 307; 0.050 Ohm
Hermetic seal	MIL-STD-202, Method 112; Cond. 1 x 10-5	MIL-STD-202, Method 112; Cond. 1 x 10-5	MIL-STD-202, Method 112; Cond. 1 x 10-5
Moisture resistance	MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106
Shock	N/A	N/A	N/A
Vibration	N/A	N/A	N/A
Thermal shock	N/A	N/A	N/A
Salt spray	N/A	N/A	N/A
Acceleration	N/A	N/A	N/A

Thermostats Line Guide

Precision Thermostats				
	3150 Series	**3153 Series**	**3156 Series**	**3200 Series**
Description	low silhouette hermetic	low silhouette hermetic	low level, silhouette hermetic	aerospace
Amperage	2.0 A/1.0 A/2.0 A/2.0 A	2.0 A resistive	100 mA/500 mA	5.0 A resistive
Housing material	steel housing hermetically sealed with glass-to-metal seal at terminal junction	steel housing hermetically sealed with glass-to-metal seal at terminal junction	steel housing hermetically sealed with glass-to-metal seal at terminal junction	steel housing hermetically sealed with glass-to-metal seal at terminal junction
Operating temperature	-29 °C to 177 °C [-20 °F to 350 °F]	-29 °C to 177 °C [-20 °F to 350 °F]	-29 °C to 204 °C [-20 °F to 400 °F]	-51 °C to 163 °C [-60 °F to 325 °F]
Environmental exposure range	-54 °C to 260 °C [-65 °F to 500 °F]	-65 °C to 260 °C [-85 °F to 500 °F]	-62 °C to 260 °C [-80 °F to 500 °F]	-65 °C to 177 °C [-85 °F to 350 °F]
Dielectric strength	MIL-STD-202, Method 301; 750 Vac 60 Hz - Terminal to Case	MIL-STD-202, Method 301; 1250 Vac 60 Hz - Terminal to Case	MIL-STD-202, Method 301; 1250 Vac 60 Hz - Terminal to Case	MIL-STD-202, Method 301; 1250 Vac
Insulation resistance	MIL-STD-202, Method 302; Cond. B - 500 MOhm - 500 Vdc applied	MIL-STD-202, Method 302; 500 MOhm	MIL-STD-202, Method 302; Cond. B - 500 MOhm - 500 Vdc applied	MIL-STD-202, Method 302; 500 MOhm
Contact resistance	MIL-STD-202, Method 307; 0.050 Ohm	MIL-STD-202, Method 307; 0.050 Ohm max.	MIL-STD-202, Method 307; 0.050 Ohm	MIL-STD-202, Method 307; 0.025 Ohm max.
Hermetic seal	MIL-STD-202, Method 112; Cond. 1 x 10-5	MIL-STD-202, Method 112; Cond. C	MIL-STD-202, Method 112; Cond. 1 x 10-5	MIL-STD-202, Method 112; Cond. C
Moisture resistance	MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106
Shock	N/A	MIL-STD-202, Method 213; 100 G	N/A	MIL-STD-202, Method 213; 750 G
Vibration	N/A	MIL-STD-202, Method 204; 20 G	N/A	MIL-STD-202, Method 204; 30 G: MIL-STD-202, Method 214; 50 G
Thermal shock	N/A	MIL-STD-202, Method 107; Cond. B	N/A	MIL-STD-202, Method 107; Cond. B
Salt spray	N/A	MIL-STD-202, Method 101; Cond. B	N/A	MIL-STD-202, Method 101; Cond. B
Acceleration	N/A	N/A	N/A	MIL-STD-202, Method 212; 20 G

2450R Series.

Features: Cost effective • Rivet sleeve construction • Low profile • Wide variety of mounting brackets and terminals

Benefits: Low profile and small size allows enhanced response to temperature changes. Factory calibrated to customer's specification. Potential for use in high current HVAC, major appliance, automotive, heat/smoke detector and copy machine applications.

2450RC Series.

Features: Cost effective • Rivet sleeve construction • Low profile • Wide variety of mounting brackets and terminals

Benefits: Low profile and small size allows enhanced response to temperature changes. Potential for use in high current HVAC, power supplies, decorative fire places, glue gun applications.

2450RCG Series.

Features: Cost effective • Gold alloy contacts • Rivet sleeve construction • Low profile • Wide variety of mounting brackets and terminals

Benefits: Low profile and small product size allows enhanced response to temperature changes. Gold alloy contacts allow for potential use for low voltage HVAC, power supply, decorative fire places and glue gun applications.

2450RG Series.

Features: Cost effective • Gold alloy contacts • Rivet sleeve construction • Wide variety of mounting brackets and terminals

Benefits: Small product size allows enhanced response to temperature changes. 4- posted "H" construction for application mounting bracket. Gold alloy contacts allow for potential use for low voltage tabletop appliance applications.

2455R Series.

Features: Cost effective • Rivet sleeve construction • High profile • High current • Wide variety of mounting brackets and terminals

Benefits: Small product size allows enhanced response to temperature changes. Factory calibrated to customer's specification. Potential for use in high current HVAC, automotive, copy machine, major appliance and heat/smoke detection applications.

2455RA Series.

Features: Cost effective • Gold alloy contacts • Epoxy-sealed cap and terminals • Wide variety of terminals • Stepped aluminum cap - 15 ft spacing, 1" collector for 30' spacing, and a 1.5 in collector for 50 ft spacing. Collector brackets available per UL

Benefits: Small size allows enhanced response to temperature changes. Epoxy sealed for long life. Available with or without heat collectors. Gold alloy contacts allow for potential use for low voltage fire alarm, smoke detector and security device applications.

2455RBV Series.

Features: Cost effective • Epoxy overmold • Rivet sleeve construction • Dust-free housing • Factory calibrated • Wide variety of mounting brackets and terminals

Benefits: Epoxy overmolded construction provides electrical insulation. Small size allows enhanced response to temperature changes. Factory calibrated to customer's specification. Potential for use in high current automotive and industrial equipment applications.

2455RC Series.

Features: Cost effective • Rivet sleeve construction • High profile • Wide variety of mounting brackets and terminals

Benefits: Small product size allows enhanced response to temperature changes. Potential for use in high current HVAC, power supply, spa and office automation applications.

2455RG Series.

Features: Cost effective • Gold alloy contacts • Rivet sleeve construction • High profile • Factory calibrated • Wide variety of mounting brackets and terminals

Benefits: Small product size allows enhanced response to temperature changes. Factory calibrated to customer's specification. Gold alloy contacts allow for potential use for low voltage HVAC, automotive, copy machines, heat/smoke detection and major appliance applications.

2455RM Series.

Features: Cost effective • Rivet sleeve construction • Factory calibrated • Wide variety of mounting brackets and terminals

Benefits: Small size allows enhanced response to temperature changes. Used in high current. Factory calibrated to customer's specification. Potential uses include HVAC, power supply and office automation.

PRECISION THERMOSTATS

3000 Series.

Features: Custom packaging • Hermetically sealed • Tight tolerances • Tight differentials • Customized probe length • Hermetic connector or potted constructions

Benefits: Internal and external design options meet exacting customer requirements. All-welded, hermetically-sealed stainless steel construction for potential military applications requiring flexibility in mounting and terminal configurations.

3100 Series.

Features: Hermetically sealed • Tight tolerances • Tight differentials • Pre-set and tamper proof • SPST contacts • Wide variety of mounting brackets and terminals

Benefits: Designed to meet or exceed critical commercial and industrial specifications. Temperature calibrations pre-set at factory. Each unit 100% thermally and mechanically inspected. Potential applications include computers, medical electronics, power supplies, industrial controls, infotech, and test equipment.

3100U Series.

Features: UL approved • Hermetically sealed • Tight tolerances • Tight differentials • Pre-set and tamper proof • SPST contacts • Wide variety of mounting brackets and terminals

Benefits: UL approved products designed to meet or exceed critical commercial and industrial specifications. Temperature calibrations pre-set at factory. Each unit 100 % thermally and mechanically inspected. Potential applications include computers, medical electronics, power supplies, industrial controls, infotech, and test equipment.

3106 Series.

Features: Gold alloy contacts • Hermetically sealed • Tight tolerances • Tight differentials • Pre-set and tamper proof • SPST contacts • Wide variety of mounting brackets and terminals

Benefits: Gold alloy contacts for low voltage applications. Designed to meet or exceed critical commercial and industrial specifications. Temperature calibrations pre-set at factory. Each unit 100% thermally and mechanically inspected. Potential applications include computers, medical electronics, power supplies, industrial controls, infotech, and test equipment.

3150 Series.

Features: Low silhouette and compact design • Hermetically sealed • Tight tolerances • Tight differentials • Pre-set and tamper proof • SPST contacts • Wide variety of mounting brackets and terminals

Benefits: Low silhouette and compact design may be well suited for potential applications including industrial, food service, telecom, medical, and infotech where space is at a premium. Temperature calibrations pre-set at factory. Each unit 100% thermally and mechanically inspected.

3153 Series.

Features: Low silhouette and compact design • Hermetically sealed • Tight tolerances • Tight differentials • Pre-set and tamper proof • SPST contacts • Wide variety of mounting brackets and terminals

Benefits: Acceptance testing performed in accordance to Mil-PRF-24236, Table III. Temperature calibrations pre-set at factory. Each unit 100% thermally and mechanically inspected. Low silhouette and compact design may be well suited for potential military and commercial aircraft applications where space is at a premium.

3156 Series.

Features: Low silhouette and compact design • Gold alloy contacts • Hermetically sealed • Tight tolerances • Tight differentials • Pre-set and tamper proof • SPST contacts • Wide variety of mounting brackets and terminals

Benefits: Gold alloy contacts for potential low voltage applications. Temperature calibrations pre-set at factory. Each unit 100% thermally and mechanically inspected. Low silhouette and compact design may be well suited for potential applications including industrial, food service, telecom, medical, and infotech where space is at a premium.

3200 Series.

Features: NASA certified • Space qualified • Hermetically sealed • Tight tolerances • Tight differentials • Pre-set and tamper proof • SPST contacts • Wide variety of mounting brackets and terminals available

Benefits: Temperature calibrations pre-set at factory. Each unit 100% thermally and mechanically inspected. Desinged to meet or exceed military and aerospace specifications for spaceflight use, including temperature stability, shock, vibration and cleanliness.

Warranty. Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

For more information about Sensing and Control products, visit www.honeywell.com/sensing or call +1-815-235-6847
Email inquiries to info.sc@honeywell.com

⚠ WARNING
PERSONAL INJURY

- DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING
MISUSE OF DOCUMENTATION

- The information presented in this catalogue is for reference only. DO NOT USE this document as product installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

Sensing and Control
Automation and Control Solutions
Honeywell
1985 Douglas Drive North
Golden Valley, MN 55422 USA
+1-815-235-6847
www.honeywell.com/sensing

Honeywell

009031-2-EN IL50 GLO
March 2011
Copyright © 2011 Honeywell International Inc. All rights reserved.

Notes

OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

FORSTAR®

Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А