

eXpert

for
experts



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PIAP

NOWOCZESNOŚĆ SKUTECZNOŚĆ DOŚWIADCZENIE

Unique features of Expert robot:

- The construction combines two contradictory needs: small mobile platform enables manoeuvres in tight places and simultaneously the manipulator has big range and load.
- Front caterpillars (remote control of tilt angle) ensure stability of the structure during surmounting high obstacles and stairs.
- Foldable lateral stabilizers enable solid lock of the mobile platform, what allows safe lifting of considerable loads and precise operation of the robot manipulator even during maximum lateral reach of its arm. Stabilizers can be dismantled what makes the mobile platform 8 cm thinner.
- Range of the manipulator with the gripping device amounts to 3 metres. Exceptionally long reach of the upper arm allows inspection of space both at the level of overhead lockers for passenger luggage and under passenger seats.
- Expert is equipped with 6 cameras. Four color cameras are placed on the gripper, in back and front of the robot and on the manipulator (the main camera which may be turned completely around by 360° and 90° up and down). Additionally two color cameras are placed on the sides of the front caterpillars, what enables the inspection of, e.g. place under seats.
- Control system of robot enables to control of its all drives at the same time.
- Auto diagnosis system constantly checks if there are any faults and shows special warnings on an supplementary LCD screen.
- Most of the robot's and manipulator's cables are routed inside the structure, thus reducing the risk of damage.





Basic features of Expert robot:

- Velocity of mobile platform (2km/h) allows quick displacement in relatively, e.g. extensive safety zone around an aircraft.
- Fluent velocity controll of all of the drives from 0 to maximum speed ensures high precision of operation. There is a possibility of the reduction of maximal velocity thus allowing precision of performed operations (after pushing an appropriate button, the maximum velocity reduces itself to 20%).
- Special manipulating driving system reduces recoil effect when firing the pyrotechnical disrupter or in case of explosion of the load placed in the gripping device or its vicinity.
- The manipulator is equipped with:
 - manipulator arm extreme position sensors,
 - positions sensors in main manipulator's degrees of freedom,
 - gripping force sensor,
 - sockets for fixing, so-called 'whiskers' on the gripper's master jaw (for visual estimation of distance),
 - an omni directional microphone.
- The length and wide spacing of the jaws of the gripping device have been selected so as to enable the gripping device to reach e.g. the interior of the locker for hand luggage in an aircraft and to get any suspicious load.





- During the external power supply (by cable) batteries are automatically recharged.
- The robot is powered by batteries installed inside the mobile platform or through a cable plugged into the 230V power network.
- The working time of the batteries is between 4 and 8 hours (depending on the type of work performed).
- Foldable operator's post designed in form of a suitcase, resistant to mechanical damage.
- Operator's post is equipped with a color LCD screen showing pictures from cameras and an additional LCD screen showing a graphic interpretation of the current manipulator arm configuration and data from the robot's sensors.
- Control cable, used interchangeably with radio transmission, is light and resistant.
- The robot can cooperate with a variety of additional devices, both offered by PIAP and those pointed by a customer.

The Expert robot can replace men in situations when human life or health is endangered.



Neutralizing and assisting (EOD/IEDD) Expert robot, as the first one worldwide, may be used for any mission inside means of transportation, e.g.: aircrafts, buses, train coaches, vessels and any other small and tight spaces. Not only can it enter these places, but also it can reach everywhere and grab any load from high or hardly accessible recesses.

Typical usage:

- Inspection, transportation and neutralisation of hazardous material.
- Reconnoitring and support for counterterrorist operations.
- High-risk hazardous environments missions.
- Building protection and supervision.
- Assisting the operation of the Inspector or other robot.



Technical description:

Dimensions of the mobile platform	750/450/460 mm (length/width/height)
Gross weight of the robot	~180 kg
Remote control	over the radio/by cable
Range of radio transmission outdoor indoor	800 m 80 m
Cable (control, vision, battery charge)	cables: 5 m and 100 m, cable roll up device, cable runner mounted on the robot
Time of robot's operation on battery power supply	4 – 8 hours
Number of degrees of freedom	7
Maximum load on folded arms on unfolded arms	15 kg 8 kg
Range of the manipulator from rotation axis from basement	2350 mm 2900 mm
Robot's cameras	6 color cameras with halogen headlights (2 x 20W) or high power light-emitting diodes (LED)
Dimensions of the operator's post unfolded folded	500/800/510 mm 450/220/510 mm
Vision monitor	15" LCD (color)
Time of operator's post operation on battery power supply	3 hours
Vision of sensor's digital reading	supplementary LCD, color, LED indicator

Optional equipment

- Holder/muzzle brake (anti-recoil) mechanism with laser sight for disrupters with the possibility of remote activation from the operator's post.
- Handle and cabling for an X-ray device.
- Set of additional batteries for the robot.
- Device for breaking car windows.
- Devices for charging of two additional batteries for the robot.
- Device for cable wind and unwind (with 100 m cable).
- Handy device remote control by radio to short-range operation of EXPERT unit (mini remote controller).
- Set of clamps for the gripper bent at 90°.
- Stand for aerials for radio range extension.
- Camera recording the robot's and microphone signals on an internal video recorder with cabling.
- Other instruments for radio transmission (control data, vision, sound) with a wide spectrum of power and frequency.
- Wide variety of chemical sensors.
- Wide variety of radiological sensors.

The equipment of the robot can be extended with other devices chosen by the customer or developed at the order. It is also possible to modify the robot to adapt it to the needs of individual clients.

Because of constant development of the products offered, the product presented in this brochure may differ from the one offered currently.